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Timber resource of Minnesota's prairie unit, 1977.

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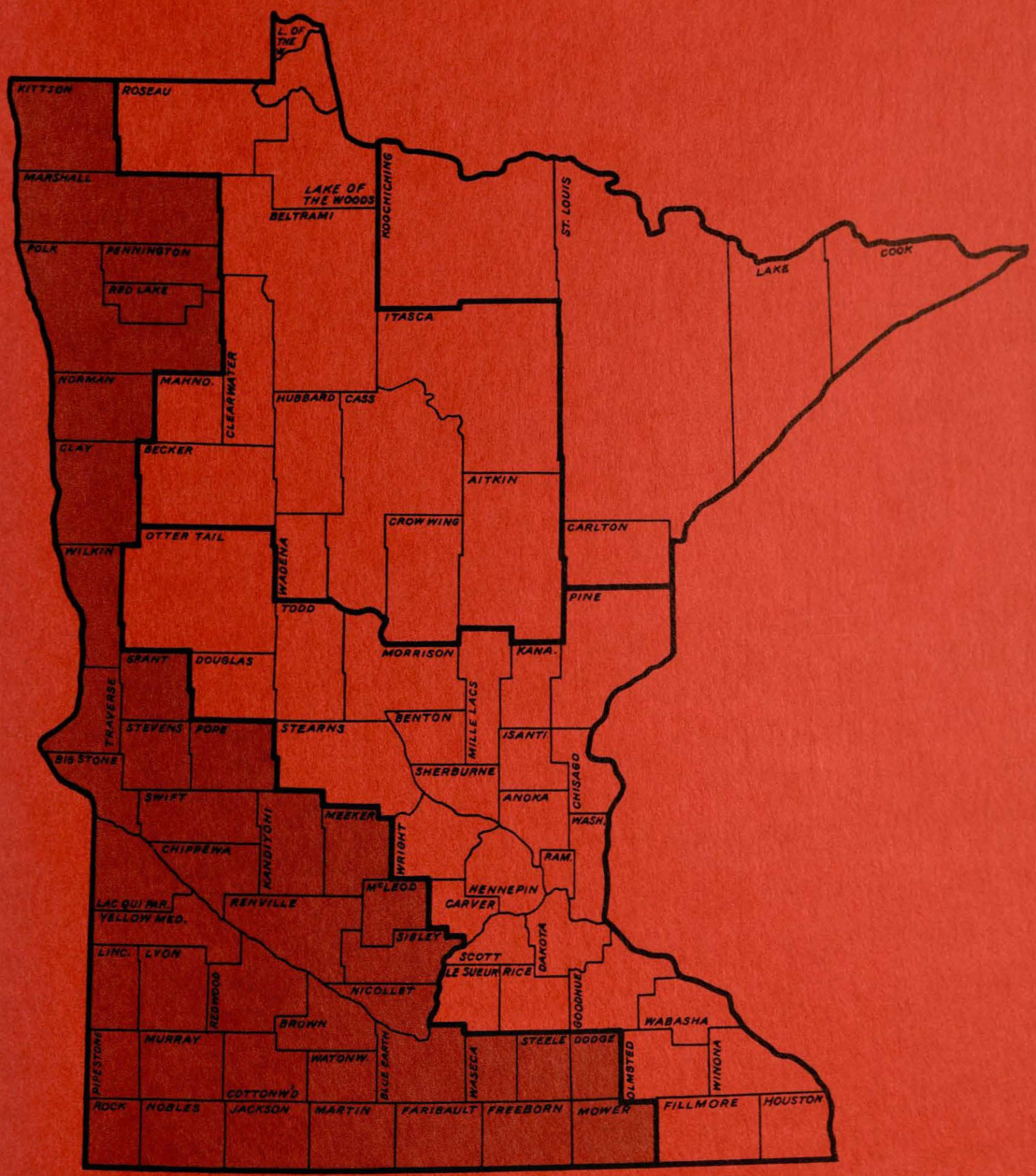

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FOREWORD

Resources Evaluation (formerly called Forest Survey) is a continuing endeavor as mandated by the Forest and Rangeland Renewable Resources Planning Act of 1974, which was preceeded by the McSweeney-McNary Forest Research Act of 1928. Its objective is to periodically inventory the Nation's forest land to determine its extent, condition, and volume of timber, growth, and depletions. This kind of up-to-date information is essential to frame intelligent forest policies and programs. USDA Forest Service regional experiment stations are responsible for conducting these inventories and publishing summary reports for individual States. The North Central Forest Experiment Station is responsible for Resources Evaluation work done in Michigan, Wisconsin, Minnesota, North Dakota, eastern South Dakota (east of 103rd meridian), Nebraska, Iowa, Illinois, Indiana, Missouri, and Kansas.

Fieldwork for the 1977 Minnesota Forest Survey began in July 1974 and was completed in July 1978. Reports on the three previous surveys of Minnesota's timber resource are dated 1936, 1953, and 1962.

Similar Resource Bulletins containing statistical highlights and detailed tables on the timber resource of the other Survey Units in Minnesota (see cover) are also available. These will provide the basis for a comprehensive analysis of the timber resource of the entire State which will be published as a separate report.

More accurate survey information was obtained during the 1977 survey than otherwise would have been feasible because of intensified field sampling made possible by funding and manpower provided the North Central Station by the State Legislature through the Minnesota Department of Natural Resources. The Department also assisted in a canvass of primary wood-using plants in the State, which was used to help estimate the quantity of timber products harvested in Minnesota.

Aerial photos used in the Prairie Unit survey were furnished by the USDA Agricultural Stabilization and Conservation Service.

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TIMBER RESOURCE OF MINNESOTA'S PRAIRIE UNIT, 1977

Jerold T. Hahn, *Principal Mensurationist,*
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HIGHLIGHTS

Forest Area

- Forest land area declined 37 percent between 1962[1] and 1977—from 922,300 to 581,500 acres.
- Commercial forest land totaled 534,200 acres in 1977, a 32 percent decline from the 782,500 acres in 1962.
- Only 3 percent of the Unit's land area is forest land. Most (88 percent) of the Unit's land is classified as cropland without trees.
- Farmers own 395,900 acres of commercial forest land (74 percent of the total) (fig.1).
- The predominant forest types are aspen, which covers 253,000 acres (47 percent of the total), and maple-basswood, which covers 117,200 acres (22 percent).
- Commercial forest area is fairly evenly divided among sawtimber stands (180,600 acres), poletimber stands (178,700 acres), and sapling and seedling stands (169,000 acres), with only 5,900 acres of nonstocked areas.
- The Unit has 38,600 acres of unproductive forest land.

[1] *1962 statistics have been adjusted from those published after the 1962 survey to conform to 1977 statistics because of changes in survey unit boundaries and in procedures and definitions. (See Comparing Minnesota's Fourth Forest Survey with the Third Survey in Appendix.)*

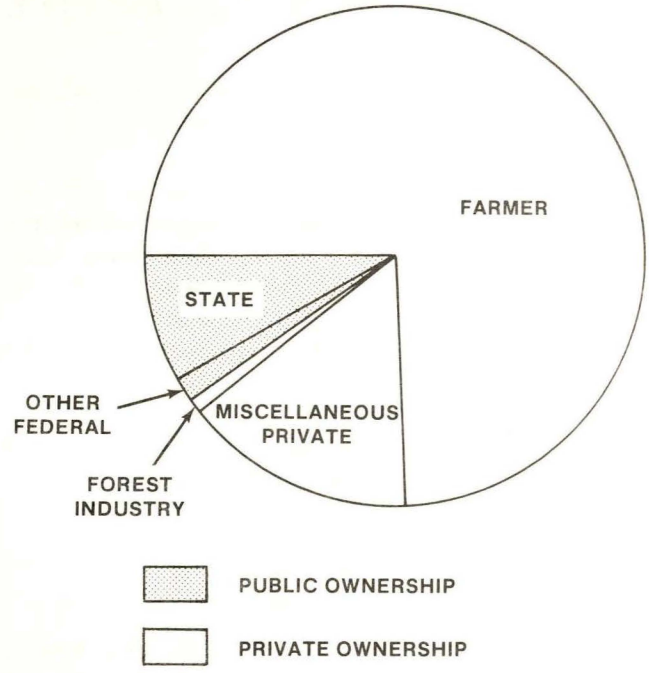

Figure 1—*Distribution of commercial forest land by ownership class, Prairie Unit, Minnesota, 1977.*

Timber Volume

- Net volume of timber is 428.8 million cubic feet—362.2 million cubic feet of growing-stock trees, 66.1 million cubic feet of cull trees, and 0.5 million cubic feet of salvable dead trees.
- Growing-stock volume rose 22 percent from 296.7 million cubic feet in 1962 to 362.2 million cubic feet in 1977 (fig. 2).

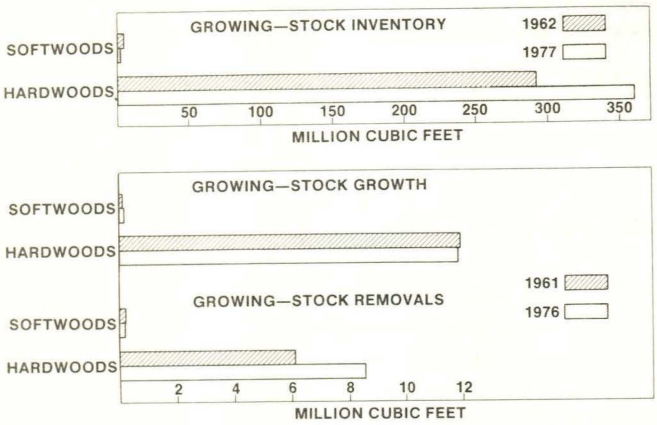

Figure 2.—Growing-stock inventory, net annual growth, and removals, by softwoods and hardwoods, Prairie Unit, Minnesota, 1962 to 1977.

- Ninety-nine percent of the growing-stock volume is hardwoods; quaking aspen, select white oaks, and elm are the most common species.
- Sawtimber volume is 1.1 billion board feet, up 62 percent since 1962.
- The average growing-stock volume per acre of commercial forest land is 678 cubic feet.

Stand Condition

- Net annual growth of growing-stock trees totaled 11.9 million cubic feet. The growth rate was 3.3 percent of inventory.
- Average annual cubic foot mortality was 6.2 million cubic feet, or 1.7 percent of inventory.
- Fifty-eight percent of the Unit's growing-stock volume is more than 50 years old.
- The average productive potential for the Unit is 48 cubic feet of growing-stock growth per acre per year.

Timber Use

- Timber removals[2] totaled 8.7 million cubic feet in 1976 as compared to 6.2 million cubic feet in 1962.
- Of the 8.7 million cubic feet harvested, 2.1 million cubic feet were for products, 6.5 million cubic were other removals, and 0.2 million cubic feet were logging residue.
- The volume of primary plant residue totaled 302,300 cubic feet.

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Area:

1. Area of land by land class, 1962 and 1977.
2. Area by land class and county.
3. Area of commercial forest land by county and ownership class.
4. Area of commercial forest land by county and forest type.
5. Area of commercial forest land by county and site index class.
6. Area of commercial forest land by county and stand-size class.
7. Area of commercial forest land by site and ownership class.
8. Area of commercial forest land by forest type and ownership class.
9. Area of commercial forest land by forest type and stand-age class.
10. Area of commercial forest land by forest type, stand-size, and site class.
11. Area of noncommercial forest land by ownership class.
12. Area of noncommercial forest land by forest type.

[2] *Removals in 1976 are trend level removals. "Other" removals from transfer of commercial forest land to productive-reserved are not included in 1976 removals.*

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14. Number of growing-stock trees on commercial forest land by species and diameter class.

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38. Net annual growth of sawtimber on commercial forest land by species and forest type.

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40. Net annual growth of sawtimber on commercial forest land by forest type and stand-age.

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47. Annual mortality of growing stock on commercial forest land by species and cause.

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49 Annual mortality of growing stock and sawtimber on commercial forest land by ownership class and softwoods and hardwoods.

Utilization

50. Output of timber products by source of material and softwoods and hardwoods.

51. Forest products harvested by ownership class and product.

52. Volume of primary plant residue by kind of material and type of use.

53. Timber products output from roundwood by species and product.

Text table:

54. Sampling errors for estimates smaller than Unit totals of volume, net growth, removals, and area of commercial forest land.

PRINCIPAL TREE SPECIES IN MINNESOTA'S PRAIRIE UNIT[3]

SOFTWOOD SPECIES

Red pine ..... *Pinus resinosa*
Jack pine ..... *Pinus banksiana*
Black spruce ..... *Picea mariana*
White spruce ..... *Picea glauca*
Balsam fir ..... *Abies balsamea*
Tamarack ..... *Larix laricina*
Other softwoods:
Eastern redcedar ..... *Juniperus virginiana*

HARDWOOD SPECIES

White oaks:
  White oak ..... *Quercus alba*
  Bur oak ..... *Quercus macrocarpa*
Select red oaks:
  Northern red oak ..... *Quercus rubra*
Other red oaks:
  Northern pin oak ..... *Quercus ellipsoidalis*
Hickories:
Bitternut hickory ..... *Carya cordiformis*
Shagbark hickory ..... *Carya ovata*
Yellow birch ..... *Betula alleghaniensis*
Hard maples:
Sugar maple ..... *Acer saccharum*
Soft maples:
Red maple ..... *Acer rubrum*
Silver maple ..... *Acer saccharinum*
Ashes:
White ash ..... *Fraxinus americana*
Black ash ..... *Fraxinus nigra*
Green ash ..... *Fraxinus pennsylvanica*
Balsam poplar ..... *Populus balsamifera*
Paper birch ..... *Betula papyrifera*
Bigtooth aspen ..... *Populus grandidentata*
Quaking aspen ..... *Populus tremuloides*
Basswood ..... *Tilia americana*
Elms:
American elm ..... *Ulmus americana*
Slippery elm ..... *Ulmus rubra*
Rock elm ..... *Ulmus thomasii*
Select hardwoods:
Butternut ..... *Juglans cinerea*
Blackwalnut ..... *Juglans nigra*
Black cherry ..... *Prunus serotina*
Other hardwoods:
Boxelder ..... *Acer negundo*
Hackberry ..... *Celtis occidentalis*
Kentucky coffeetree ..... *Gymnocladus dioicus*
Eastern cottonwood ..... *Populus deltoides*
Black willow ..... *Salix nigra*

[3]*The common and scientific names are based on: Little, Elbert L., Jr. 1953. Check list of native and naturalized trees of the United States (including Alaska). U.S. Dep. Agric., Agric. Handb. 41, 472 p.*

APPENDIX

ACCURACY OF SURVEY

Resources Evaluation information is based on a sampling procedure designed to provide reliable statistics at the State and Survey Unit levels. Consequently, the reported figures are only estimates. However, a measure of reliability of these figures is given by sampling errors. These sampling errors may be interpreted as meaning that the chances are two out of three that if a 100-percent inventory had been taken, using the same methods, the results would have been within the limits indicated.

For example, the estimated area of commercial forest land in the Prairie Unit in 1977, 534,200 acres, has a sampling error of ± 3.12 percent (± 16,700 acres). The chances are two out of three that the commercial forest area from a 100-percent inventory, then, would fall between 517,500 and 550,900 acres (534,200 ± 16,700).

The following sampling errors are for total estimated volume, net growth, and removals for both growing stock and sawtimber, and for area of commercial forest land during the 1977 Prairie Unit survey:

Item	Aspen-Birch Unit totals	Sampling error (percent)
Growing stock:		
Volume	362.2 million cubic feet	4.91
Growth	11.9 million cubic feet	5.79
Removals	8.7 million cubic feet	11.56
Sawtimber:		
Volume	1.1 billion board feet	7.80
Growth	39.3 million board feet	9.00
Removals	17.9 million board feet	11.86
Commercial forest land:	534,200 acres	3.12

As survey data are broken down into units smaller than State or Survey Unit totals, the sampling error increases (table 54). The smaller the breakdown, the larger the sampling error. For example, the sampling error for area of commercial forest land in a particular county is higher than that for total commercial forest area in the Survey Unit.

SURVEY PROCEDURE

The major steps in the survey of the Prairie Unit were as follows:

1. A total of 102,869 1-acre points distributed systematically across aerial photos of the entire area, were observed. To make a preliminary estimate of forest area, these points were classified as either forest land (3,745), unproductive forest land (11), nonforest land (98,993), or questionable (120). Next, all 3,745 of the forest points and all 120 of the questionable points were stereoclassified as to forest type, stand-size class, and density. Then 495 points classed as forest, 16 points classed as questionable, and 13,469 points classed as nonforest were examined on the ground to correct the preliminary area estimate for errors in classification and for actual changes in land use since the photos were taken. At each of the 13,469 commercial forest locations, 10 variable-radius plots (basal area factor 37.5) were established uniformly over the sample acre. Tree measurements made on these plots were the basis for estimates of timber volume, growth, mortality, number of trees, and other forest classifications.

2. Growth and mortality on all commercial forest land were estimated using the Forest Resources Evaluation Program (FREP)[4]; which is an individual tree-growth projection system that uses stand characteristics such as tree diameter to estimate tree volumes.

3. Statistics on timber utilization during 1975 were obtained from mill surveys. The Minnesota Department of Natural Resources and the North Central Forest Experiment Station canvassed resident sawmills, veneer mills, and other primary wood-using plants. The North Central Forest Experiment Station canvassed resident pulpmills as well as out-of-State sawmills, pulpmills, and veneer mills to

[4]*For more information on FREP, see: U.S. Department of Agriculture, Forest Service. 1979. A generalized forest growth projection system for the Lake States Region. U.S. Dep. Agric. For. Serv., Gen. Tech. Rep. NC-49, 96 p. U.S. Dep. Agric. For. Serv., North Cent. For. Exp. Stn., St. Paul, MN.*

determine their use of timber from Minnesota. Fuelwood and fencepost output was based on a sample of private landowners to determine their production of fuelwood and fenceposts and on a canvass of industrial and public timber owners. Estimates of primary mill residue used for fuelwood were obtained from the canvass of Minnesota primary wood-using plants. Timber cut for products by ownership class was determined by a canvass of all public and industrial timber owners. The portion of timber cut unaccounted for by the latter owners was grouped under "farmer and other owners".

4. To develop wood utilization factors used in converting timber products output to timber removals for saw logs and pulpwood, 1,028 felled trees throughout the State were measured during 1975-1976. Factors for veneer logs were obtained during the 1967-1968 Wisconsin utilization study. Factors for all other products were obtained during the 1960-1961 Minnesota utilization study.

5. Field data were sent to St. Paul, Minnesota, for compilation.

COMPARING MINNESOTA'S FOURTH SURVEY WITH THE THIRD SURVEY

Data from new forest surveys are often compared with data from earlier forest surveys to determine trends in forest areas and volumes. Changes in procedures and definitions between surveys make it necessary to adjust earlier survey data so they are comparable to data from the new survey.

In Minnesota's Prairie Unit, published 1962 commercial forest area was adjusted to take into account changes in the Unit boundaries between surveys and changes in survey methods. The result, an adjusted 1962 commercial forest area, appears in the tables presented in this report.

Original estimates of 1962 inventory, growth, mortality, and removals were based on the original, unadjusted 1962 commercial forest area. However, because 1962 commercial forest area was adjusted to take into account changes in survey methods, the estimates of inventory, growth, mortality, and removals for the year must also reflect these changes.

A test was made to ensure that it was possible to move from 1962 volumes to the new 1977 volumes by means of Timber Resource Analysis System (TRAS), a Forest Service computer program for updating, backdating, and projecting timber volume, growth, mortality and removals. In order for the program to work most effectively, the 2 years to be reconciled must have comparable commercial forest land bases so that changes in volumes between surveys reflect actual changes in forest conditions or land use. To achieve this condition it was necessary to make further adjustments in 1962 data so that land transferred from commercial forest to productive-reserved between the two surveys does not appear in the 1962 land base. If this adjustment were not made, removals between 1962 and 1977 would appear artificially high in order to absorb the loss of timber from this change in land status. This adjustment is made for the test only; area and volumes removed for the test are added back into the 1962 reported data.

TRAS recalculated 1962 volumes using 1977 estimates of cubic foot volume per tree and board foot-cubic foot ratios. This volume adjustment was necessary so that differences in volumes between surveys reflected actual change and not merely a change in the volume equations used on each occasion.

When the final adjustments of 1962 data were completed, the resulting 1962 volumes and area were distributed among the four Survey Units. A check was made by hand to ensure that it was possible to move from the adjusted 1962 volumes to the new 1977 volumes in each Unit. This was done using the average periodic difference between growth and removals for the two surveys and applying this difference to the 1962 volume. Next, the same procedure was repeated for each individual species within each Unit to make certain inventory volumes reported for each species were consistent with reported growth and removals volumes.

METRIC EQUIVALENTS OF UNITS USED IN THIS REPORT

1 acre = 4,046.86 square meters or 0.405 hectare.
1,000 acres = 405 hectares.
1,000 board feet (International-inch log rule) = 3.48 cubic meters.
Breast height = 1.4 meters above the ground.
1 cubic foot = 0.0283 cubic meter.
1 foot = 30.48 centimeters or 0.3048 meter.
1 inch = 25.4 millimeters or 2.54 centimeters or 0.0254 meter.

DEFINITION OF TERMS

Land-use Classes

Gross area.—The entire area of land and water as determined by the Bureau of Census, 1970.

Land area.—The area of dry land and land temporarily or partially covered by water such as marshes, swamps, flood plains, streams, sloughs, and estuaries. Canals less than 1/8-mile wide, and lakes, reservoirs, and ponds smaller than 40 acres are included as land area. These figures are from the Bureau of Census, 1970.

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having such tree cover, and not currently developed for nonforest use. Includes afforested areas. The minimum forest area classified was 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas were classed as forest if less than 120 feet wide.

Commercial forest land.—Forest land that is producing or is capable of producing crops of industrial wood and that is not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for management to grow crops of industrial wood generally of a site quality capable of producing in excess of 20 cubic feet per acre of annual growth. This includes both inaccessible and inoperable areas.

Noncommercial forest land.—(a) Unproductive—forest land incapable of yielding crops of industrial wood because of adverse site conditions, (b) Productive-reserved—forest land withdrawn from commercial timber use through statute or administrative regulation, or exclusively used for Christmas tree production.

Nonforest land.—Land that has never supported forests, and land formerly forested where forest use is precluded by development for nonforest uses, such as cropland, improved pasture, residential areas, and city parks. Also includes improved roads and adjoining rights-of-way, powerline clearings, and certain areas of water classified by the Bureau of Census as land. Unimproved roads, streams, canals, and nonforest strips in forest areas must be more than 120 feet wide, and clearings in forested areas must be more than 1 acre in size, to qualify as nonforest land.

Ownership Classes

National forest.—Federal land that has been designated by executive order or statute as National Forests or purchase units, and other land under the administration of the USDA Forest Service.

Other Federal.—Federal land other than National Forest.

State, county, and municipal.—Land owned by States, counties, or local public agencies, or land leased by them for more than 50 years.

Forest industry.—Land owned by companies or individuals operating primary wood-using plants.

Farmer-owned.—Land owned by operators of farms. A farm must include 10 or more acres from which the sale of agricultural products totals $50 or more annually, or if less than 10 acres, the yield must be at least $250 annually.

Farmer-owned, leased.—Land owned by an operator of a farm but leased to another party.

Miscellaneous private-corporation.—Land owned by a private corporation not in the business of operating primary wood-using plants.

Miscellaneous private-individual.—Land owned by a private individual.

Miscellaneous private-corporation, leased.—Land owned by a private corporation but leased to another party.

Miscellaneous private-individual, leased.—Land owned by a private individual but leased to another party.

Tree Classes

All live trees.—Growing-stock, rough, and rotten trees 1 inch d.b.h. and larger.

Growing-stock trees.—All live trees of commercial species except rough and rotten trees.

Desirable trees.—Growing-stock trees having no serious defects in quality limiting present or prospective use, and of relatively high vigor and containing no pathogens that may kill or seriously deteriorate them before rotation age. These are trees that would be favored by forest managers in silvicultural operations.

Acceptable trees.—Trees meeting the standards for growing stock but not qualifying as desirable trees.

Sawtimber trees.—Growing-stock trees of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs, each 8 feet or longer. At least 33 percent of the gross volume of the tree must be sound wood. Softwoods must be at least 9.0 inches d.b.h. and hardwoods must be at least 11.0 inches.

Poletimber trees.—Growing-stock trees of commercial species at least 5.0 inches d.b.h. but smaller than sawtimber size and of good form and vigor.

Saplings.—Live trees of commercial species 1.0 to 5.0 inches d.b.h. and of good form and vigor.

Seedlings.—Live trees of commercial species less than 1.0 inch d.b.h. that are expected to survive according to regional standards. (Examples of seedlings not expected to survive are those that are diseased or heavily damaged by logging, browsing, or fire.) Only softwood seedlings more than 6 inches and hardwood seedlings more than 1 foot tall are counted.

Rotten trees.—Live trees (any size) of commercial species that do not contain a merchantable 12-foot saw log or two noncontiguous 8-foot or longer saw logs, now or prospectively, because of rot (that is, when more than 50 percent of the cull volume of the tree is rotten).

Rough trees.—Live trees that do not contain at least one merchantable 12-foot saw log or two noncontiguous 8-foot or longer saw logs, now or prospectively, because of roughness and poor form, as well as all live noncommercial species.

Short-log (rough trees).—Sawtimber-sized trees of commercial species that contain at least one merchantable 8- to 11-foot saw log but not a 12-foot saw log.

Stocking

The degree of utilization of land by trees as measured in terms of basal area and/or the number of trees in a stand compared to the basal area and/or number of trees required to fully utilize the growth potential of the land.

A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5 inches d.b.h. and larger. In a stand of trees less than 5 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees reach 5 inches d.b.h.

Stocking of all live trees, growing-stock trees, and desirable trees are recorded separately and stands are grouped into the following stocking classes.

Stocking Classes

Overstocked stands.—Stands in which stocking of trees is 133 percent or more.

Fully stocked stands.—Stands in which stocking of trees is from 100 to 133 percent.

Medium-stocked stands.—Stands in which stocking of trees is from 60 to 100 percent.

Poorly stocked stands.—Stands in which stocking of trees is from 16.7 to 60 percent.

Nonstocked areas.—Commercial forest land on which stocking of trees is less than 16.7 percent.

Stand-size Classes

Stand.—A growth of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Sawtimber stands.—Stands at least 16.7 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber or poletimber trees and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.—Stands at least 16.7 percent stocked with growing-stock trees, and with half or more of this stocking in sawtimber and/or poletimber trees and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.—Stands at least 16.7 percent stocked with growing-stock trees and with saplings and/or seedlings comprising more than half of this stocking.

Nonstocked areas.—Commercial forest land on which stocking of growing-stock trees is less than 16.7 percent.

Other Classifications

Site index.—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Site classes.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood expressed in cubic-foot growth per acre per year.

Stand-age.—Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Basal area.—The area in square feet of the cross section at breast height of a single tree. When the basal area of all the trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

Forest Types

A classification of forest land based upon the species forming a plurality of live-tree stocking. Major forest types in Minnesota are:

Jack pine.—Forests in which jack pine comprises a plurality of the stocking. (Common associates include eastern white pine, red pine, aspen, birch, and maple.)

Red pine.—Forests in which red pine comprises a plurality of the stocking. (Common associates include eastern white pine, jack pine, aspen, birch, and maple.)

White pine.—Forests in which eastern white pine comprises a plurality of the stocking. (Common associates include red pine, jack pine, aspen, birch, and maple.)

Balsam fir.—Forests in which balsam fir comprises a plurality of stocking. (Common associates include white spruce, aspen, maple, birch, northern white-cedar, and tamarack.)

White spruce.—Forests in which white spruce comprises a plurality of the stocking. (Common associates include balsam fir, aspen, maple, birch, northern white-cedar, and tamarack.)

Black spruce.—Forests in which swamp conifers (black spruce, tamarack, and northern white-cedar) comprise a plurality of the live-tree stocking, with black spruce the most common.

Northern white-cedar.—Forests in which swamp conifers comprise a plurality of live-tree stocking, with northern white-cedar the most common.

Tamarack.—Forests in which swamp conifers comprise a plurality of live-tree stocking, with tamarack the most common.

Oak.—Forests in which northern red oak, white oak, or bur oak, singly or in combination, comprise a plurality of the stocking. (Common associates include elm, maple, and aspen.)

Elm-ash-cottonwood.—Forests in which lowland elm, ash, cottonwood and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include basswood and balsam poplar.)

Maple-basswood.—Forests in which sugar maple, basswood, yellow birch, upland American elm, and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include white pine and elm.)

Aspen.—Forests in which quaking aspen or bigtooth aspen, singly or in combination, comprise a plurality of the stocking. (Common associates include balsam poplar, balsam fir, and paper birch.)

Paper birch.—Forests in which paper birch comprises a plurality of the stocking. (Common associates include maple, aspen, and balsam fir.)

Balsam poplar.—Forests in which balsam poplar comprises a plurality of the stocking. (Common associates include aspen, elm, and ash.)

Timber Volume

Volume of growing stock.—The volume of sound wood in the bole of growing-stock trees 5.0 inches d.b.h. and over, from a 1-foot stump to a minimum of 4.0-inch top diameter outside bark, or to the point where the central stem breaks into limbs. Growing-stock volumes are shown in cubic feet. Conversion to cords may be accomplished by a factor of 79 cubic feet per solid wood cord.

Volume of sawtimber.—Net volume of the saw log portion of live sawtimber trees in board feet, International ¼-inch rule, from stump to a minimum 7 inches top diameter outside bark for softwoods and 9 inches for hardwoods.

Upper stem portion.—That part of the bole of sawtimber trees above the merchantable sawtimber top to a minimum top diameter of 4.0 inches outside bark or to the point where the central stem breaks into limbs.

Growth and Mortality

Net volume growth of growing stock.—Net annual growth of growing stock is the change in volume of sound wood that occurred during 1976 in growing-stock trees that were 5.0 inches d.b.h. or larger at the beginning of the year,

plus

the volume of sound wood in growing-stock trees smaller than 5.0 inches d.b.h. at the beginning of the

year that grew sufficiently during the year to be reclassified into the 5.0-inch-or-larger d.b.h. classes (ingrowth),

plus

the volume of sound wood in trees that had been classified either as rough or rotten trees at the beginning of the year but were reclassified during the year as growing-stock trees,

plus

the annual change in volume of sound wood that occurred during the year on growing-stock trees that died during the year,

plus

the annual change in volume of sound wood that occurred in growing-stock trees included among timber removals for the year,

plus

the annual change in volume of sound wood in trees that had been classified as growing stock at the beginning of the year but were reclassified during the year as rotten or rough trees. Only the volume change that occurred during the portion of the year the trees were classified as growing stock was included,

minus

the volume of sound wood in growing-stock trees that died from natural causes during the year,

minus

the volume of sound wood in trees that had been classified as growing stock at the beginning of the year, but were reclassified during the year as rough or rotten trees.

Net annual growth of sawtimber.—Net annual growth of sawtimber is the change in volume of sound wood that occurred during 1976 in trees that were sawtimber size at the beginning of the year,

plus

the volume of sound wood in growing-stock trees smaller than sawtimber size at the beginning of the year that grew sufficiently during the year to be classified as sawtimber trees (ingrowth),

plus

the volume of sound wood in trees that had been classified either as rough or rotten trees at the beginning of the year, but were reclassified during the year as sawtimber trees,

plus

the annual change in volume of sound wood that occurred during the year on sawtimber trees that died during the year,

plus

the annual change in volume of sound wood that occurred in sawtimber trees included among timber removals for the year.

plus

The annual change in volume of sound wood in trees that had been classified as sawtimber trees at the beginning of the year, but were reclassified during the year as rough or rotten trees. Only the volume change that occurred during the portion of the year the trees were classified as sawtimber was included,

minus

the volume of sound wood in trees that had been classified as sawtimber trees that died from natural causes during the year, and

minus

the volume of sound wood in trees that had been classified as sawtimber trees at the beginning of the year, but were reclassified during the year as rough or rotten trees.

Mortality of growing stock.—The volume of sound wood in growing-stock trees dying annually from natural causes. Natural causes include fire, insects, disease, animal damage, weather, and suppression.

Mortality of sawtimber.—The net board-foot volume of sawtimber trees dying annually from natural causes.

Timber Removals

Timber removals from growing stock.—The volume of sound wood in growing-stock trees removed annually for forest products (including roundwood products and logging residues) and for other removals. Roundwood products are logs, bolts, or other round sections cut and used from trees. Logging residues are the unused portions of cut trees plus unused trees killed by logging. Other removals are growing-stock trees removed but not utilized for products or trees left standing but "removed" from the commercial forest land classification by land use change—examples are removals from cultural operations such as timber stand improvement work, land clearing, and changes in land use.

Timber removals from sawtimber.—The net board-foot volume of live sawtimber trees removed for forest products annually (including roundwood products and logging residues) and for other removals.

Timber products output.—All timber products cut from roundwood, and byproducts of wood manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and screenings of pulpmills that are used as pulpwood chips or other products.

Plant byproducts.—Wood products, such as pulpwood chips, obtained incidental to production of other manufactured products.

Plant residues.—Wood materials from manufacturing plants not utilized for some product.

Table 1.—*Area of land by land class, Prairie Unit, Minnesota, 1962 and 1977*

(In thousand acres)

Land class	[1]1962	1977
COMMERCIAL FOREST LAND:		
Jack pine	—	—
Red pine	—	—
White pine	—	—
Balsam fir	—	—
White spruce	—	—
Black spruce	3.2	—
Northern white-cedar	6.5	—
Tamarack	10.0	1.0
Oak-hickory	59.2	69.3
Elm-ash-cottonwood	250.4	55.1
Maple-basswood	94.1	117.2
Aspen	328.2	253.0
Paper birch	—	—
Balsam poplar	—	32.7
Nonstocked	30.9	5.9
Subtotal	782.5	534.2
NONCOMMERCIAL FOREST LAND:		
Unproductive	136.3	38.6
Productive-reserved	3.5	8.7
Subtotal	139.8	47.3
NONFOREST LAND:	18,347.5	18,555.6
Total	19,269.8	19,137.1

[1]Figures have been adjusted from those published after 1962 survey to conform to 1977 areas because of changes in survey procedures and definitions.

Table 2.—*Area of land by land use class and county, Prairie Unit, Minnesota, 1977*
(In thousand acres)

Land class	All counties	Big Stone	Blue Earth	Brown	Chippewa	Clay	Cotton-wood	Dodge	Faribault	Freeborn	Grant	Jackson	Kandiyohi	Kittson	Lac qui Parle	Lincoln
FOREST LAND:																
Commercial	534.2	2.4	21.4	9.1	3.9	10.3	2.5	6.4	6.2	4.8	2.9	2.1	9.9	67.5	4.6	2.0
Productive-reserved	8.7	0.1	0.3	0.6	—	0.4	—	—	—	0.2	—	—	0.7	0.2	0.4	—
Unproductive	38.6	0.2	1.9	1.0	0.1	0.5	0.1	1.0	0.3	0.7	0.1	0.2	1.8	4.2	0.2	0.2
Total	581.5	2.7	23.6	10.7	4.0	11.2	2.6	7.4	6.5	5.7	3.0	2.3	12.4	71.9	5.2	2.2
NONFOREST LAND:																
Nonforest with trees:																
Cropland with trees	9.5	—	0.6	0.2	0.1	0.1	—	0.3	0.1	0.1	0.1	—	0.6	0.7	—	—
Improved pasture with trees	5.9	—	0.4	0.1	0.1	0.2	—	0.1	0.1	0.1	0.1	—	0.2	0.5	—	—
Wooded strips	24.3	0.1	1.6	0.4	0.3	0.9	0.1	0.5	0.2	0.3	0.3	0.1	0.7	2.5	0.1	0.1
Idle farmland with trees	1.0	—	—	—	0.1	—	—	—	0.1	—	0.1	—	—	—	—	—
Windbreaks	22.1	—	1.6	—	0.7	0.8	—	0.3	0.6	—	0.5	—	0.8	1.0	—	—
Wooded pasture	9.1	—	0.2	0.1	0.2	—	0.1	—	0.3	—	0.1	—	0.1	1.2	0.1	—
Subtotal	71.9	0.1	4.4	0.8	1.5	2.0	0.2	1.2	1.4	0.5	1.2	0.1	2.4	5.9	0.2	0.1
Nonforest without trees:																
Cropland without trees	16,838.5	287.1	404.3	347.9	333.9	597.6	371.7	246.1	409.3	403.8	316.5	411.3	453.4	572.8	444.0	306.5
Improved pasture without trees	143.3	2.4	3.5	3.0	2.8	4.9	3.1	2.0	3.5	3.3	2.6	3.4	3.7	5.5	3.8	2.5
Idle farmland without trees	3.6	—	—	—	—	—	—	—	—	—	—	—	—	1.6	—	—
Marsh	498.6	8.0	11.1	9.5	9.1	16.7	9.9	6.7	11.0	11.0	8.5	11.0	12.6	24.6	11.9	8.2
Other farm-farmstead	274.6	4.6	7.0	5.6	5.5	9.2	6.1	3.7	6.9	6.0	4.8	6.3	7.2	9.5	7.4	4.8
Urban and other	687.3	8.9	15.6	12.0	15.1	23.4	13.4	10.9	16.5	17.7	10.4	11.1	8.1	26.8	13.8	14.6
Noncensus water	37.8	—	1.8	0.8	0.3	4.1	—	0.4	—	0.4	2.6	—	1.4	0.4	5.3	0.9
Subtotal	18,483.7	311.0	443.3	378.8	366.7	655.9	404.2	269.8	447.2	442.2	345.4	443.1	486.4	641.2	486.2	337.5
Total	18,555.6	311.1	447.7	379.6	368.2	657.9	404.4	271.0	448.6	442.7	346.6	443.2	488.8	647.1	486.4	337.6
Total land area[1]	19,137.1	313.8	471.3	390.3	372.2	669.1	407.0	278.4	455.1	448.4	349.6	445.5	501.2	719.0	491.6	339.8
Census water	324.0	20.3	10.6	5.2	2.2	4.2	5.8	—	4.4	11.1	17.7	13.4	50.5	0.4	4.4	6.4
TOTAL GROSS AREA	19,461.1	334.1	481.9	395.5	374.4	673.3	412.8	278.4	459.5	459.5	367.3	458.9	551.7	719.4	496.0	346.2

[1]International ¼-inch rule.

(Table 2 continued on next page)

(Table 2 continued)

Land class	Lyon	McLeod	Marshall	Martin	Meeker	Mower	Murray	Nicollet	Nobles	Norman	Pennington	Pipestone	Polk	Pope	Red Lake	Redwood	Renville	Rock
FOREST LAND:																		
Commercial	4.4	5.8	128.5	3.6	10.8	5.2	1.1	12.3	0.7	22.2	30.7	0.4	68.0	6.9	27.2	6.2	7.2	0.5
Productive-reserved	0.6	—	3.5	—	—	0.2	0.2	0.4	—	—	—	—	—	0.3	0.1	—	0.1	—
Unproductive	0.3	0.3	10.7	0.2	1.2	0.7	0.1	1.0	—	0.9	1.3	—	3.3	0.6	1.6	0.5	0.7	—
Total	5.3	6.1	142.7	3.8	12.0	6.1	1.4	13.7	0.7	23.1	32.0	0.4	71.3	7.8	28.9	6.7	8.0	0.5
NONFOREST LAND:																		
Nonforest with trees:																		
Croplandwithtrees	—	—	1.5	0.1	1.7	0.2	—	0.4	—	0.3	0.2	—	0.6	0.2	0.1	0.1	0.1	—
Improved pasture withtrees	—	—	0.8	0.1	0.8	0.1	—	0.4	—	0.2	0.1	—	0.4	0.1	—	0.1	0.1	—
Wooded strips	0.2	0.1	4.7	0.2	1.5	0.4	—	0.7	—	0.8	0.6	—	2.2	0.5	0.5	0.3	0.3	—
Idle farmland with trees	—	—	0.1	0.1	—	0.1	—	0.1	—	—	—	—	—	0.1	—	—	—	—
Windbreaks	0.1	—	3.2	0.4	2.8	0.6	—	1.0	—	0.5	0.2	—	1.6	0.8	—	0.4	—	—
Wooded pasture	0.1	—	1.6	0.2	—	0.2	—	0.3	—	0.9	0.5	—	1.2	0.3	0.2	0.2	0.1	—
Subtotal	0.4	0.1	11.9	1.1	6.8	1.6	—	2.9	—	2.7	1.6	—	6.0	2.0	0.8	1.1	0.6	—
Nonforest without trees:																		
Cropland without trees	409.0	281.6	866.9	410.4	336.2	403.5	412.7	241.0	417.5	492.4	330.3	271.8	1,091.2	380.1	221.5	503.8	565.8	283.1
Improved pasture without trees	3.5	2.4	7.9	3.4	2.8	3.4	3.4	2.2	3.5	4.2	2.9	2.2	9.8	3.1	2.0	4.2	4.8	2.3
Idle farmland without trees	—	—	1.6	—	—	—	—	—	—	0.1	0.1	—	—	—	0.2	—	—	—
Marsh	11.0	7.5	49.2	11.0	9.5	10.9	11.0	6.5	11.2	14.1	10.2	7.3	33.1	10.8	7.8	13.7	15.2	7.6
Other farm-farmstead	6.7	4.4	14.8	6.6	5.1	6.1	6.4	4.3	6.3	9.4	6.3	4.1	20.0	6.0	4.3	8.1	9.0	4.3
Urban and other	17.4	9.6	47.9	13.8	23.2	17.7	15.0	4.8	16.3	20.1	14.3	11.2	50.3	15.3	11.0	21.6	22.9	12.6
Noncensus water	0.2	0.6	2.2	—	0.7	0.6	—	1.3	—	0.3	0.3	—	6.4	3.2	—	0.2	—	—
Subtotal	447.8	306.1	990.5	445.2	377.5	442.2	448.5	260.1	454.8	540.6	364.4	296.6	1,210.8	418.5	246.8	551.6	617.7	309.9
Total	448.2	306.2	1,002.4	446.3	384.3	443.8	448.5	263.0	454.8	543.3	366.0	296.6	1,216.8	420.5	247.6	552.7	618.3	309.9
Total land area[1]	453.5	312.3	1,145.1	450.1	396.3	449.9	449.9	276.7	455.5	566.4	398.0	297.0	1,288.1	428.3	276.5	559.4	626.3	310.4
Census water	4.7	9.6	6.9	15.2	13.3	—	11.5	17.1	4.7	—	0.1	—	9.8	31.2	—	—	2.2	—
TOTAL GROSS AREA	458.2	321.9	1,152.0	465.3	409.6	449.9	461.4	293.8	460.2	566.4	398.1	297.0	1,297.9	459.5	276.5	559.4	628.5	310.4

(Table 2 continued on next page)

(Table 2 continued)

Land class	Sibley	Steele	Stevens	Swift	Traverse	Waseca	Watonwan	Wilkin	Yellow Medicine
FOREST LAND:									
Commercial	10.9	5.0	1.0	4.7	0.9	4.6	1.1	0.5	7.8
Productive-reserved	—	0.1	—	0.1	—	—	—	—	0.2
Unproductive	1.0	0.5	—	0.2	—	0.4	—	—	0.6
Total	11.9	5.6	1.0	5.0	0.9	5.0	1.1	0.5	8.6
NONFOREST LAND:									
Nonforest with trees:									
Cropland with trees	0.1	0.5	0.1	—	—	0.3	—	—	0.1
Improved pasture with trees	0.1	0.3	0.1	—	—	0.2	—	—	0.1
Wooded strips	1.3	0.6	0.2	0.1	0.1	0.4	—	—	0.4
Idle farmland with trees	—	0.1	0.1	—	—	—	—	—	—
Windbreaks	1.3	1.3	0.8	—	—	0.4	—	—	0.4
Wooded pasture	0.1	0.2	0.2	0.1	—	—	—	—	0.3
Subtotal	2.9	3.0	1.5	0.2	0.1	1.3	—	—	1.3
Nonforest without trees:									
Cropland without trees	323.5	240.7	326.8	429.5	331.5	237.5	252.5	440.5	431.0
Improved pasture without trees	2.8	2.0	2.7	3.6	2.7	2.0	2.2	3.6	3.7
Idle farmland without trees	—	—	—	—	—	—	—	—	—
Marsh	8.8	6.5	8.8	11.7	8.9	6.4	6.7	11.8	11.6
Other farm-farmstead	5.3	3.8	5.0	7.1	5.0	3.7	4.0	6.6	7.3
Urban and other	17.1	10.7	10.8	15.7	14.0	9.4	10.4	17.6	18.3
Noncensus water	0.9	—	0.6	0.4	0.6	—	—	0.5	0.4
Subtotal	358.4	263.7	354.7	468.0	362.7	259.0	275.8	480.6	472.3
Total	361.3	266.7	356.2	468.2	362.8	260.3	275.8	480.6	473.6
Total land area[1]	373.2	272.3	357.2	473.2	363.7	265.3	276.9	481.1	482.2
Census water	4.4	1.0	9.5	5.5	8.1	6.7	2.8	0.2	2.9
TOTAL GROSS AREA	377.6	273.3	366.7	478.7	371.8	272.0	279.7	481.3	485.1

Table 3.—*Area of commercial forest land by county and ownership class, Prairie Unit, Minnesota, 1977*
(In thousand acres)

County	All owners	Ownership class							
		Misc. federal	State	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.	Misc. priv.-corp., leased	Misc. priv.-indiv., leased
Big Stone	2.4	0.1	0.2	—	1.9	—	0.2	—	—
Blue Earth	21.4	—	0.4	—	17.2	0.2	3.5	—	0.1
Brown	9.1	—	—	—	7.5	0.2	1.3	—	0.1
Chippewa	3.9	0.1	0.3	—	3.0	0.1	0.4	—	—
Clay	10.3	0.1	0.4	0.1	8.7	0.1	0.9	—	—
Cottonwood	2.5	—	0.1	—	2.0	—	0.4	—	—
Dodge	6.4	—	—	—	5.1	0.2	1.1	—	—
Faribault	6.2	—	0.3	—	5.1	—	0.7	—	0.1
Freeborn	4.8	—	0.1	—	3.9	0.1	0.7	—	—
Grant	2.9	—	—	—	2.5	—	0.4	—	—
Jackson	2.1	—	—	—	1.7	—	0.4	—	—
Kandiyohi	9.9	0.1	0.2	—	8.5	0.2	0.9	—	—
Kittson	67.5	1.4	10.0	0.6	43.7	0.7	10.9	0.2	—
Lac qui Parle	4.4	—	0.3	—	3.7	—	0.5	—	0.1
Lincoln	2.0	—	—	—	1.6	—	0.4	—	—
Lyon	4.4	—	0.3	—	3.5	—	0.7	—	0.1
McLeod	5.8	—	0.1	—	4.7	—	1.0	—	—
Marshall	128.5	4.0	18.7	1.3	85.9	1.2	16.4	1.0	—
Martin	3.6	—	—	—	2.8	—	0.7	—	0.1
Meeker	10.8	0.1	0.1	—	8.3	0.2	2.1	—	—
Mower	5.2	—	—	—	4.1	0.1	1.0	—	—
Murray	1.1	—	0.2	—	0.8	—	0.1	—	—
Nicollet	12.3	—	0.1	—	9.7	—	2.4	—	0.1
Nobles	0.7	—	—	—	0.6	—	0.1	—	—
Norman	22.2	0.3	1.2	0.1	17.2	0.1	3.1	—	0.2
Pennington	30.7	0.6	2.7	0.2	23.0	0.1	3.9	0.1	0.1
Pipestone	0.4	—	—	—	0.3	—	0.1	—	—
Polk	68.0	1.4	4.9	0.6	53.4	0.3	7.0	0.2	0.2
Pope	6.9	0.2	0.4	—	5.2	0.1	1.0	—	—
Red Lake	27.2	0.6	2.3	0.1	20.1	0.1	3.8	0.2	—
Redwood	6.2	—	0.3	—	4.9	0.1	0.9	—	—
Renville	7.2	—	0.2	—	5.8	0.1	1.0	—	0.1
Rock	0.5	—	0.1	—	0.4	—	—	—	—
Sibley	10.9	—	0.1	—	8.8	0.1	1.9	—	—
Steele	5.0	—	0.1	—	3.9	0.1	0.9	—	—
Stevens	1.0	—	—	—	0.8	—	0.2	—	—
Swift	4.7	—	0.4	—	3.7	—	0.6	—	—
Traverse	0.9	—	—	—	0.8	—	0.1	—	—
Waseca	4.6	—	0.1	—	3.5	—	1.0	—	—
Watonwan	1.1	—	0.2	—	0.9	—	—	—	—
Wilkin	0.5	—	—	—	0.5	—	—	—	—
Yellow Medicine	7.8	—	0.2	—	6.3	0.1	1.1	—	0.1
All counties	534.2	9.0	45.0	3.0	396.0	4.5	73.7	1.7	1.3

Table 4.—*Area of commercial forest land by county and forest type, Prairie Unit, Minnesota, 1977*
(In thousand acres)

County	All types	Forest type						
		Tamarack	Oak-hickory	Elm-ash-cottonwood	Maple-basswood	Aspen	Balsam poplar	Non-stocked
Big Stone	2.4	—	0.2	0.6	0.7	0.8	0.1	—
Blue Earth	21.4	—	5.0	2.2	11.7	2.0	0.2	0.3
Brown	9.1	—	2.5	1.0	4.6	0.8	0.1	0.1
Chippewa	3.9	—	0.2	1.0	1.0	1.4	0.2	0.1
Clay	10.3	—	2.0	1.6	2.0	4.0	0.6	0.1
Cottonwood	2.5	—	0.2	0.5	1.1	0.6	0.1	—
Dodge	6.4	—	2.5	0.3	3.3	0.2	—	0.1
Faribault	6.2	—	0.8	1.1	3.4	0.8	0.1	—
Freeborn	4.8	—	1.6	0.3	2.2	0.5	0.1	0.1
Grant	2.9	—	0.9	0.3	0.8	0.9	—	—
Jackson	2.1	—	0.5	0.2	1.0	0.4	—	—
Kandiyohi	9.9	—	3.5	1.3	2.7	2.0	0.3	0.1
Kittson	67.5	—	3.7	3.9	1.9	52.3	5.0	0.7
Lac qui Parle	4.6	—	0.5	1.1	1.9	1.0	0.1	—
Lincoln	2.0	—	0.5	0.2	0.9	0.4	—	—
Lyon	4.4	—	0.6	0.9	2.0	0.7	0.1	0.1
McLeod	5.8	—	1.2	0.5	3.5	0.6	—	—
Marshall	128.5	0.7	8.3	11.4	5.7	87.9	13.2	1.3
Martin	3.6	—	0.4	0.6	1.5	0.9	0.1	0.1
Meeker	10.8	—	2.7	0.7	6.6	0.4	0.1	0.3
Mower	5.2	—	1.7	0.3	2.8	0.3	—	0.1
Murray	1.1	—	0.1	0.3	0.5	0.2	—	—
Nicollet	12.3	—	2.3	1.1	7.4	1.1	0.1	0.3
Nobles	0.7	—	0.1	0.1	0.2	0.3	—	—
Norman	22.2	—	1.8	3.2	4.0	11.5	1.4	0.3
Pennington	30.7	—	2.5	2.8	3.5	19.3	2.4	0.2
Pipestone	0.4	—	0.1	0.1	0.1	0.1	—	—
Polk	68.0	0.1	8.9	7.7	13.2	32.4	5.1	0.6
Pope	6.9	0.1	1.1	1.2	1.3	2.7	0.4	0.1
Red Lake	27.2	—	2.4	2.0	2.8	17.7	2.1	0.2
Redwood	6.2	—	1.3	1.0	2.1	1.5	0.2	0.1
Renville	7.2	0.1	1.6	0.9	3.3	1.1	0.1	0.1
Rock	0.5	—	—	0.1	0.2	0.2	—	—
Sibley	10.9	—	2.8	1.0	6.0	0.9	0.1	0.1
Steele	5.0	—	1.4	0.3	2.6	0.5	0.1	0.1
Stevens	1.0	—	0.2	0.1	0.2	0.5	—	—
Swift	4.7	—	0.5	1.0	1.7	1.3	0.1	0.1
Traverse	0.9	—	0.1	0.2	0.1	0.4	0.1	—
Waseca	4.6	—	0.9	0.4	2.7	0.5	—	0.1
Watonwan	1.1	—	—	0.4	0.7	—	—	—
Wilkin	0.5	—	—	0.1	—	0.4	—	—
Yellow Medicine	7.	1.7	1.1	3.3	1.5	0.1	0.1	
All counties	534.2	1.0	69.3	55.1	117.2	253.0	32.7	5.9

Table 5.—*Area of commercial forest land by county and site index class, Prairie Unit, Minnesota, 1977*
(In thousand acres)

County	All classes	Site index class (feet)							
		91+	81-90	71-80	61-70	51-60	41-50	31-40	21-30*
Big Stone	2.4	—	—	0.1	0.3	1.0	0.7	0.3	—
Blue Earth	21.4	0.3	0.2	2.1	4.0	7.5	4.2	3.1	—
Brown	9.1	0.1	0.1	0.6	2.1	3.4	1.7	1.1	—
Chippewa	3.9	—	—	0.2	0.4	1.7	1.0	0.6	—
Clay	10.3	—	—	1.1	1.2	2.8	2.6	2.6	—
Cottonwood	2.5	—	—	0.3	0.5	1.0	0.5	0.2	—
Dodge	6.4	0.2	0.1	0.3	1.3	2.5	1.1	0.9	—
Faribault	6.2	—	—	1.0	1.0	2.1	1.4	0.7	—
Freeborn	4.8	0.1	0.1	0.2	1.0	1.9	0.9	0.6	—
Grant	2.9	—	—	0.5	0.2	0.5	0.7	1.0	—
Jackson	2.1	—	—	0.3	0.4	0.7	0.4	0.3	—
Kandiyohi	9.9	0.1	—	0.4	1.1	4.2	2.7	1.4	—
Kittson	67.5	—	—	3.7	12.3	23.4	21.1	6.5	0.5
Lac qui Parle	4.6	—	—	0.5	0.8	1.7	1.1	0.5	—
Lincoln	2.0	—	—	0.2	0.4	0.8	0.4	0.2	—
Lyon	4.4	—	—	0.3	0.7	1.8	1.0	0.6	—
McLeod	5.8	—	—	1.2	0.7	1.6	1.2	1.1	—
Marshall	128.5	—	—	7.3	23.0	44.3	38.5	14.0	1.4
Martin	3.6	—	—	0.5	0.7	1.3	0.7	0.4	—
Meeker	10.8	0.1	0.3	0.8	2.6	3.6	2.2	1.2	—
Mower	5.2	0.1	0.1	0.3	1.2	2.0	0.9	0.6	—
Murray	1.1	—	—	—	0.1	0.6	0.3	0.1	—
Nicollet	12.3	—	0.3	1.3	3.0	4.1	2.4	1.2	—
Nobles	0.7	—	—	0.1	0.1	0.3	0.1	0.1	—
Norman	22.2	—	—	2.2	4.3	8.1	5.1	2.5	—
Pennington	30.7	—	—	2.8	6.7	10.9	7.7	2.5	0.1
Pipestone	0.4	—	—	—	0.1	0.1	0.1	0.1	—
Polk	68.0	0.1	—	6.9	12.8	22.7	16.5	8.9	0.1
Pope	6.9	—	—	0.5	1.1	2.4	1.7	1.1	0.1
Red Lake	27.2	—	—	2.4	5.8	9.9	6.8	2.3	—
Redwood	6.2	0.1	—	0.4	0.9	2.6	1.4	0.8	—
Renville	7.2	0.1	—	0.7	1.5	2.5	1.4	0.9	0.1
Rock	0.5	—	—	—	—	0.3	0.1	0.1	—
Sibley	10.9	0.1	0.1	1.2	2.0	3.7	2.1	1.7	—
Steele	5.0	0.1	0.1	0.3	1.1	1.8	1.0	0.6	—
Stevens	1.0	—	—	0.1	0.1	0.3	0.2	0.3	—
Swift	4.7	—	—	0.4	0.6	1.9	1.1	0.7	—
Traverse	0.9	—	—	—	0.1	0.4	0.2	0.2	—
Waseca	4.6	—	0.1	0.3	1.2	1.7	0.9	0.4	—
Watonwan	1.1	—	—	0.1	0.2	0.4	0.4	—	—
Wilkin	0.5	—	—	—	—	0.2	0.2	0.1	—
Yellow Medicine	7.8	—	—	0.9	1.4	2.8	1.7	1.0	—
All counties	534.2	1.5	1.5	42.5	99.0	187.5	136.4	63.5	2.3

Table 6.—*Area of commercial forest land by county and stand-size class, Prairie Unit, Minnesota, 1977*
(In thousand acres)

County	All stands	Stand-size class			
		Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked areas
Big Stone	2.4	1.0	0.7	0.7	—
Blue Earth	21.4	15.3	3.3	2.5	0.3
Brown	9.1	6.5	1.5	1.0	0.1
Chippewa	3.9	1.3	1.3	1.2	0.1
Clay	10.3	3.7	3.2	3.3	0.1
Cottonwood	2.5	1.2	0.9	0.4	—
Dodge	6.4	5.0	0.9	0.4	0.1
Faribault	6.2	4.0	1.3	0.9	—
Freeborn	4.8	3.3	0.8	0.6	0.1
Grant	2.9	1.4	1.1	0.4	—
Jackson	2.1	1.4	0.5	0.2	—
Kandiyohi	9.9	6.0	2.1	1.7	0.1
Kittson	67.5	6.3	28.0	32.5	0.7
Lac qui Parle	4.6	2.3	1.2	1.1	—
Lincoln	2.0	1.4	0.5	0.1	—
Lyon	4.4	2.3	1.9	0.9	0.1
McLeod	5.8	4.3	1.0	0.5	—
Marshall	128.5	16.7	47.7	62.9	1.2
Martin	3.6	2.0	1.1	0.4	0.1
Meeker	10.8	8.8	0.7	1.0	0.3
Mower	5.2	4.0	0.8	0.3	0.1
Murray	1.1	0.6	0.3	0.2	—
Nicollet	12.3	9.3	1.4	1.3	0.3
Nobles	0.7	0.3	0.3	0.1	—
Norman	22.2	6.4	9.6	5.9	0.3
Pennington	30.7	6.3	14.3	9.9	0.2
Pipestone	0.4	0.2	0.2	—	—
Polk	68.0	20.7	26.1	20.5	0.7
Pope	6.9	2.4	2.4	2.0	0.1
Red Lake	27.2	5.3	13.0	8.7	0.2
Redwood	6.2	3.1	1.8	1.2	0.1
Renville	7.2	4.5	1.5	1.1	0.1
Rock	0.5	0.2	0.2	0.1	—
Sibley	10.9	8.0	1.8	1.0	0.1
Steele	5.0	3.6	0.8	0.5	0.1
Stevens	1.0	0.4	0.4	0.2	—
Swift	4.7	2.0	1.6	1.0	0.1
Traverse	0.9	0.3	0.3	0.3	—
Waseca	4.6	3.5	0.5	0.5	0.1
Watonwan	1.1	0.6	0.2	0.3	—
Wilkin	0.5	0.1	0.1	0.3	—
Yellow Medicine	7.8	4.6	2.2	0.9	0.1
All counties	534.2	180.6	178.7	169.0	5.9

Table 7.—*Area of commercial forest land by site and ownership class, Prairie Unit, Minnesota, 1977*
(In thousand acres)

Ownership class	All classes	Site class (cubic feet of growth / acre / year)		
		85-120	50-85	20-5
Miscellaneous federal	9.0	—	1.3	7.7
State	45.0	—	25.1	19.9
Forest industry	3.0	—	1.7	1.3
Farmer	396.0	16.5	122.5	257.0
Misc. private-corp.	4.5	—	—	4.5
Misc. private-individual	73.7	2.4	22.1	49.2
Misc. priv.-corp., leased	1.7	—	1.7	—
Misc. priv.-ind., leased	1.3	—	1.3	—
All owners	534.2	18.9	175.7	339.6

Table 8.—*Area of commercial forest land by forest type and ownership class, Prairie Unit, Minnesota, 1977*
(In thousand acres)

Ownership class	All types	Forest type						
		Tamarack	Oak-hickory	Elm-ash-cottonwood	Maple-basswood	Aspen	Balsam poplar	Non-stocked
Miscellaneous federal	9.0	—	—	—	—	4.0	3.4	1.6
State	45.0	1.0	—	4.9	—	32.4	6.7	—
Forest industry	3.0	—	1.3	—	—	—	1.7	—
Farmer	396.0	—	60.9	43.1	84.9	186.2	16.6	4.3
Misc. private-corp.	4.5	—	1.5	—	—	1.3	1.7	—
Misc. private-individual	73.7	—	5.6	7.1	31.0	27.4	2.6	—
Misc. private corp., leased	1.7	—	—	—	—	1.7	—	—
Misc. private ind., leased	1.3	—	—	—	1.3	—	—	—
All owners	534.2	1.0	69.3	55.1	117.2	253.0	32.7	5.9

Table 9.—*Area of commercial forest land by forest type and stand-age class, Prairie Unit, Minnesota, 1977*
(In thousand acres)

Forest type	All ages	Stand-age class (years)											
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140
Tamarack	1.0	—	1.0	—	—	—	—	—	—	—	—	—	—
Oak-hickory	69.3	6.0	1.3	—	1.3	6.1	2.8	9.9	9.5	15.6	14.2	2.6	—
Elm-ash-cottonwood	55.1	1.3	—	6.2	6.1	9.7	10.8	7.9	2.6	1.6	5.9	1.3	1.7
Maple-basswood	117.2	1.3	6.2	5.3	1.5	5.4	17.1	25.2	29.8	11.9	9.7	9.7	1.1
Aspen	253.0	61.0	45.9	24.7	46.9	45.3	16.1	8.0	3.8	1.3	—	—	—
Balsam poplar	32.7	6.3	5.1	3.0	8.1	7.4	1.5	1.3	—	—	—	—	—
Nonstocked	5.9	1.4	1.5	—	1.3	1.7	—	—	—	—	—	—	—
All types	534.2	77.3	61.0	39.2	65.2	75.6	48.3	52.3	38.7	30.4	29.8	13.6	2.8

Table 10.—*Area of commercial forest land by forest type, stand-size class, and site class, Prairie Unit, Minnesota, 1977*

(In thousand acres)

Forest type and stand-size class	All site classes	Site class (cubic feet of growth / acre / year)		
		85-120	50-85	Less than 50
Tamarack				
Sawtimber	—	—	—	—
Poletimber	—	—	—	—
Sapling & seedling	1.0	—	—	1.0
All stands	1.0	—	—	1.0
Oak-hickory				
Sawtimber	44.0	—	7.6	36.4
Poletimber	18.0	—	—	18.0
Sapling & seedling	7.3	—	1.5	5.8
All stands	69.3	—	9.1	60.2
Elm-ash-cottonwood				
Sawtimber	34.3	1.5	9.7	23.1
Poletimber	17.8	—	—	17.8
Sapling & seedling	3.0	—	—	3.0
All stands	55.1	1.5	9.7	43.9
Maple-basswood				
Sawtimber	93.9	1.5	37.2	55.2
Poletimber	13.4	—	2.9	10.5
Sapling & seedling	9.9	1.1	2.0	6.8
All stands	117.2	2.6	42.1	72.5
Aspen				
Sawtimber	8.4	—	4.1	4.3
Poletimber	111.3	12.2	54.7	44.4
Sapling & seedling	133.3	2.6	47.7	83.0
Allstands	253.0	14.8	106.5	131.7
Balsam poplar				
Sawtimber	—	—	—	—
Poletimber	18.2	—	6.6	11.6
Sapling & seedling	14.5	—	1.7	12.8
All stands	32.7	—	8.3	24.4
Nonstocked	5.9	—	—	5.9
All types	534.2	18.9	175.7	339.6

Table 11.—*Area of noncommercial forest land by ownership class, Prairie Unit, Minnesota, 1977*
(In thousand acres)

Ownership class	All areas	Productive-reserved areas	Unproductive areas
National forest	—	—	—
Other federal	4.4	3.3	1.1
State, county and municipal	13.1	5.4	7.7
Forest industry	—	—	—
Farmer	23.2	—	23.2
Miscellaneous private	6.6	—	6.6
All ownerships	47.3	8.7	38.6

Table 12.—*Area of noncommercial forest land by forest type, Prairie Unit, Minnesota, 1977*
(In thousand acres)

Forest type	All areas	Productive-reserved areas	Unproductive areas
Spruce-fir	2.6	2.6	—
Black spruce	2.7	—	2.7
Oak-hickory	16.6	2.6	14.0
Elm-ash-cottonwood	6.2	3.1	3.1
Maple-basswood	1.4	0.1	1.3
Aspen-birch	17.8	0.3	17.5
All types	47.3	8.7	38.6

Table 13.—*Number of all live trees on commercial forest land by species and diameter class, Prairie Unit, Minnesota, 1977*
(In thousand trees)

		Diameter class (inches at breast height)													
Species	All classes	1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:															
Red pine	19	—	—	—	—	—	7	4	3	5	—	—	—	—	—
Jack pine	43	—	—	—	17	19	7	—	—	—	—	—	—	—	—
White spruce	39	—	—	26	—	—	—	6	—	7	—	—	—	—	—
Black spruce	183	100	—	83	—	—	—	—	—	—	—	—	—	—	—
Balsam fir	192	133	—	59	—	—	—	—	—	—	—	—	—	—	—
Tamarack	188	—	100	17	65	—	—	6	—	—	—	—	—	—	—
Other softwoods	3,222	1,643	1,198	277	47	52	—	5	—	—	—	—	—	—	—
Total	3,886	1,876	1,298	462	129	71	14	21	3	12	—	—	—	—	—
HARDWOODS:															
Select white oaks	18,318	5,659	4,310	2,318	1,459	1,581	1,266	679	502	219	160	81	73	11	—
Select red oaks	2,315	289	375	367	441	217	163	195	116	66	18	28	29	11	—
Other red oaks	45	—	—	30	—	—	—	5	6	—	1	2	1	—	—
Hickory	82	—	—	40	20	11	8	—	—	1	2	—	—	—	—
Yellow birch	36	—	—	—	36	—	—	—	—	—	—	—	—	—	—
Hard maple	2,699	1,083	355	427	305	141	136	138	52	42	10	5	5	—	—
Soft maple	341	—	—	125	63	30	22	42	11	3	14	4	12	10	5
Ash	14,724	6,906	3,089	1,680	1,281	776	420	295	109	70	27	31	36	4	—
Balsam poplar	22,454	9,988	5,977	3,075	2,021	872	374	123	18	4	—	—	—	1	1
Paper birch	1,472	521	402	261	150	95	32	4	3	4	—	—	—	—	—
Bigtooth aspen	79	65	—	14	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	111,553	58,571	21,528	15,781	9,888	4,096	1,207	375	88	12	3	4	—	—	—
Basswood	4,981	2,307	436	263	351	336	368	313	257	190	81	37	37	5	—
Elm	18,991	8,850	4,709	1,761	990	730	470	371	389	192	161	112	176	71	9
Select hardwoods	3,602	2,320	739	218	191	69	20	27	—	12	2	2	2	—	—
Other hardwoods	21,290	9,135	5,260	2,633	1,720	1,007	667	381	184	90	75	60	44	24	10
Noncommercial species	10,912	8,672	1,356	611	224	41	8	—	—	—	—	—	—	—	—
Total	233,894	114,366	48,536	29,604	19,140	10,002	5,161	2,948	1,735	905	554	366	415	137	25
All species	237,780	116,242	49,834	30,066	19,269	10,073	5,175	2,969	1,738	917	554	366	415	137	25

Table 14.—*Number of growing-stock trees on commercial forest land by species and diameter class, Prairie Unit, Minnesota, 1977*
(In thousand trees)

Species	All classes	Diameter class (inches at breast height)													
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:															
Red pine	19	—	—	—	—	—	7	4	3	5	—	—	—	—	—
Jack pine	43	—	—	—	17	19	7	—	—	—	—	—	—	—	—
White spruce	39	—	—	26	—	—	—	6	—	7	—	—	—	—	—
Black spruce	184	100	—	84	—	—	—	—	—	—	—	—	—	—	—
Balsam fir	192	133	—	59	—	—	—	—	—	—	—	—	—	—	—
Tamarack	178	—	100	17	55	—	—	6	—	—	—	—	—	—	—
Other softwoods	1,361	290	736	255	47	28	—	5	—	—	—	—	—	—	—
Total	2,016	523	836	441	119	47	14	21	3	12	—	—	—	—	—
HARDWOODS:															
Select white oaks	14,774	4,660	3,156	1,718	1,294	1,450	1,077	569	418	185	124	62	53	8	—
Select red oaks	2,074	289	375	317	382	185	156	165	105	39	13	17	24	7	—
Other red oaks	45	—	—	31	—	—	—	5	5	—	1	2	1	—	—
Hickory	80	—	—	40	19	11	8	—	—	—	2	—	—	—	—
Yellow birch	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hard maple	2,413	1,083	356	331	266	114	78	95	43	36	6	2	3	—	—
Soft maple	276	—	—	125	63	29	14	12	11	—	7	4	7	2	2
Ash	11,056	5,047	2,241	1,385	1,084	590	288	213	86	59	19	26	17	1	—
Balsam poplar	17,955	8,337	4,444	2,419	1,637	736	266	96	15	4	—	—	—	1	—
Paper birch	1,371	521	402	173	150	95	19	4	3	4	—	—	—	—	—
Bigtooth aspen	14	—	—	14	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	84,415	45,854	17,119	10,838	6,991	2,707	687	174	39	6	—	—	—	—	—
Basswood	4,332	2,030	436	240	259	261	317	267	219	170	66	35	30	2	—
Elm	14,668	7,277	3,399	1,201	749	563	287	290	327	164	130	92	140	44	5
Select hardwoods	2,939	1,899	739	58	149	49	13	16	—	12	—	2	2	—	—
Other hardwoods	15,322	6,555	4,193	1,685	1,248	772	369	233	76	57	46	41	21	18	8
Noncommercial species	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	171,734	83,552	36,860	20,575	14,291	7,562	3,579	2,139	1,347	736	414	283	298	83	15
All species	173,750	84,075	37,696	21,016	14,410	7,609	3,593	2,160	1,350	748	414	283	298	83	15

Table 15.—*Number of short-log trees on commercial forest land by species and diameter class, Prairie Unit, Minnesota, 1977*
(In thousand trees)

Species	All classes	Diameter class (inches at breast height)									
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:											
White pine	—	—	—	—	—	—	—	—	—	—	—
Red pine	—	—	—	—	—	—	—	—	—	—	—
Jack pine	—	—	—	—	—	—	—	—	—	—	—
White spruce	—	—	—	—	—	—	—	—	—	—	—
Black spruce	—	—	—	—	—	—	—	—	—	—	—
Balsam fir	—	—	—	—	—	—	—	—	—	—	—
Tamarack	—	—	—	—	—	—	—	—	—	—	—
Northern white-cedar	—	—	—	—	—	—	—	—	—	—	—
Other softwoods	24	24	—	—	—	—	—	—	—	—	—
Total	24	24	—	—	—	—	—	—	—	—	—
HARDWOODS:											
Select white oaks	234	—	64	71	54	11	17	8	8	1	—
Select red oaks	5	—	—	5	—	—	—	—	—	—	—
Hard maple	41	—	22	12	3	—	2	—	2	—	—
Soft maple	19	—	—	17	—	—	2	—	—	—	—
Ash	45	—	19	18	4	3	—	—	—	1	—
Balsam poplar	28	—	27	—	—	—	—	—	—	—	1
Quaking aspen	133	—	79	43	11	—	—	—	—	—	—
Basswood	33	—	12	10	7	4	—	—	—	—	—
Elm	166	—	100	11	26	6	5	6	9	3	—
Other hardwoods	187	—	88	65	20	7	3	—	2	—	2
Total	891	—	411	252	125	31	29	14	21	5	3
All species	915	24	411	252	125	31	29	14	21	5	3

Table 16.—*Net volume of growing stock and sawtimber on commercial forest land by species, Prairie Unit, Minnesota, 1962 and 1977*

Species	Growing stock		Sawtimber	
	[1]1962	1977	[1]1962	1977
	Thousand cubic feet		*[2]Thousand board feet*	
SOFTWOODS:				
Red pine	640	492	3,011	3,167
Jack pine	315	292	603	1,100
Spruce	816	453	852	1,794
Balsam fir	592	174	612	—
Tamarack	812	313	755	447
Northern white cedar	1,486	—	2,223	—
Other softwoods	—	825	—	1,259
Total	4,661	2,549	8,056	7,767
HARDWOODS:				
White oak	54,903	60,049	160,981	226,880
Red oak	16,042	16,074	38,019	65,510
Hard maple	5,564	7,484	18,793	29,372
Soft maple	3,609	3,335	8,901	17,241
Ash	25,433	23,733	45,243	100,769
Paper birch	2,269	3,048	1,323	2,876
Aspen	65,304	97,226	51,669	68,477
Basswood	18,512	29,510	55,458	148,474
Elm	65,698	58,860	241,828	270,859
Other hardwoods	35,081	60,344	53,681	169,872
Total	292,055	359,663	675,896	1,100,330
All species	296,716	362,212	683,952	1,108,097

[1]Figures have been adjusted from those published after the 1962 survey to conform to 1977 volumes because of changes in survey definitions and procedures.
[2]International ¼-inch rule.

Table 17.—*Cubic foot volume in all live trees on commercial forest land by species and diameter class, Prairie Unit, Minnesota, 1977*
(In thousand cubic feet)

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:													
Red pine	492	—	—	—	87	95	100	210	—	—	—	—	—
Jack pine	291	—	67	148	76	—	—	—	—	—	—	—	—
White spruce	390	60	—	—	—	111	—	219	—	—	—	—	—
Black spruce	63	63	—	—	—	—	—	—	—	—	—	—	—
Balsam fir	174	174	—	—	—	—	—	—	—	—	—	—	—
Tamarack	313	21	197	—	—	95	—	—	—	—	—	—	—
Other softwoods	939	415	127	314	—	83	—	—	—	—	—	—	—
Total	2,662	733	391	462	163	384	100	429	—	—	—	—	—
HARDWOODS:													
Select white oaks	67,806	3,512	5,292	9,969	12,026	9,218	9,322	5,515	4,881	3,232	4,123	716	—
Select red oaks	17,561	792	1,868	1,497	2,026	3,133	2,428	1,583	650	1,147	1,589	848	—
Other red oaks	522	65	—	—	—	85	140	—	49	148	35	—	—
Hickory	412	27	73	87	90	—	—	37	98	—	—	—	—
Yellow birch	100	—	100	—	—	—	—	—	—	—	—	—	—
Hard maple	8,794	837	1,248	903	1,070	1,868	1,001	1,041	288	245	293	—	—
Soft maple	5,057	311	349	323	208	394	321	70	387	150	738	783	1,023
Ash	27,654	2,961	5,088	4,506	3,498	4,068	2,031	1,604	761	1,310	1,627	200	—
Balsam poplar	29,332	6,418	9,175	6,765	4,117	2,141	411	96	—	—	—	172	37
Paper birch	3,287	701	1,013	897	420	87	70	99	—	—	—	—	—
Bigtooth aspen	27	27	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	123,202	32,370	40,905	29,818	12,751	5,363	1,600	275	33	87	—	—	—
Basswood	32,404	575	1,356	2,379	4,279	5,139	5,383	5,617	3,050	1,925	2,326	375	—
Elm	66,860	3,136	3,669	4,632	4,384	5,425	7,938	5,446	5,760	5,206	11,347	8,011	1,906
Select hardwoods	2,424	229	653	399	186	398	—	317	34	79	129	—	—
Other hardwoods	38,270	3,554	4,944	5,443	4,312	4,159	2,280	1,842	2,154	2,310	1,959	2,572	2,741
Noncommercial species	1,929	848	797	209	75	—	—	—	—	—	—	—	—
Total	425,641	56,363	76,530	67,827	49,442	41,478	32,925	23,542	18,145	15,839	24,166	13,677	5,707
All species	428,303	57,096	76,921	68,289	49,605	41,862	33,025	23,971	18,145	15,839	24,166	13,677	5,707

Table 18.—*Net volume of timber on commercial forest land by class of timber and softwooods and hardwoods, Prairie Unit, Minnesota, 1977*

(In thousand cubic feet)

Class of timber	All species	Softwoods	Hardwoods
GROWING STOCK TREES:			
Saw log trees:			
Saw log portion	140,548	1,039	139,509
Upper-stem portion	49,978	399	49,579
Subtotal	190,526	1,438	189,088
Poletimber trees	171,686	1,111	170,575
Total	362,212	2,549	359,663
CULL TREES:			
Rough and rotten cull trees:			
Sawtimber	24,666	—	24,666
Poletimber	30,158	12	30,146
Subtotal	54,824	12	54,812
Short-log cull trees:			
Sawtimber	11,267	101	11,166
Poletimber	—	—	—
Subtotal	11,267	101	11,166
Total	66,091	113	65,978
SALVABLE DEAD TREES:	520	—	520
All classes	428,823	2,662	426,161

Table 19.—*Net volume of growing stock on commercial forest land by species and county, Prairie Unit, Minnesota, 1977*
(In thousand cubic feet)

Species	All Counties	Big Stone	Blue Earth	Brown	Chippewa	Clay	Cotton-wood	Dodge	Faribault	Freeborn	Grant	Jackson	Kandiyoh	Kittson	Lac Qui Parle	Lincoln	Lyon	McLeod	Marshall	Martin
SOFTWOODS:																				
Red pine	492	—	—	—	—	—	—	—	—	—	—	—	—	186	—	—	—	—	233	—
Jack pine	292	—	—	—	—	—	—	—	—	—	—	—	—	110	—	—	—	—	138	—
White spruce	390	—	2	—	—	12	—	—	—	2	—	—	3	46	1	—	—	—	155	—
Black spruce	63	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46	—
Balsam fir	174	—	—	—	—	—	—	—	—	—	—	—	—	68	—	—	—	—	82	—
Tamarack	313	—	—	—	—	—	—	—	—	—	—	—	—	93	—	—	—	—	166	—
Other softwoods	825	2	93	66	5	8	—	69	6	43	1	3	57	13	2	9	10	1	41	1
Total	2,549	2	95	66	5	20	—	69	6	45	1	3	60	516	3	9	10	1	861	1
HARDWOODS:																				
Select white oak	60,049	273	3,878	1,554	364	1,738	280	1,325	946	946	744	412	2,493	3,745	455	402	533	1,369	8,424	502
Select red oak	15,552	9	1,662	914	17	104	12	878	143	578	45	105	460	707	21	123	161	166	1,112	64
Other red oaks	522	—	56	30	—	39	—	28	2	19	17	7	11	—	—	4	3	4	7	2
Hickory	376	—	58	26	—	—	—	27	10	17	—	3	18	—	—	3	4	18	2	3
Hard maple	7,484	—	1,117	293	—	295	—	243	197	173	126	113	34	—	—	36	51	465	112	86
Soft maple	3,335	11	369	202	14	12	32	163	101	100	3	22	130	37	56	31	54	86	89	38
Ash	23,733	119	1,274	578	188	696	215	322	506	217	320	131	375	1,366	384	125	296	411	3,296	246
Balsam poplar	25,779	89	201	94	172	313	112	—	104	28	54	57	224	4,780	140	63	96	48	8,309	158
Paper birch	3,048	22	118	53	40	149	18	36	35	32	57	12	72	185	32	15	26	40	550	28
Bigtooth aspen	27	—	1	—	—	8	—	—	—	—	3	1	—	—	—	—	—	1	2	—
Quaking aspen	97,199	282	982	469	487	1,427	382	162	446	221	458	206	709	16,958	480	230	359	309	29,096	521
Basswood	29,510	124	3,253	1,304	174	307	191	1,055	759	712	120	263	887	528	337	226	453	927	1,432	321
Elm	58,860	323	4,810	1,955	497	1,275	566	1,256	1,624	830	579	435	1,464	1,693	1,006	400	866	1,655	4,505	751
Select hardwoods	1,955	6	225	102	8	8	16	71	56	46	2	18	39	27	29	15	29	58	63	25
Other hardwoods	32,234	314	1,668	886	472	905	329	501	673	375	186	170	971	1,479	637	185	544	281	5,258	339
Total	359,663	1,572	19,672	8,460	2,433	7,276	2,153	6,067	5,602	4,294	2,714	1,955	7,887	31,505	3,577	1,858	3,475	5,838	62,257	3,084
All species	362,212	1,574	19,767	8,526	2,438	7,296	2,153	6,136	5,608	4,339	2,715	1,958	7,947	32,021	3,580	1,867	3,485	5,839	63,118	3,085

(Table 19 continued on next page)

(Table 19 continued)

Species	Meeker	Mower	Murray	Nicollet	Nobles	Norman	Pennington	Pipe-stone	Polk	Pope	Red Lake	Redwood	Renville	Rock	Sibley	Steele	Stevens	Swift	Traverse	Waseca	Watonwan	Wilkin	Yellow Medicine
SOFTWOODS:																							
Red pine	—	—	—	—	—	7	23	—	24	1	18	—	—	—	—	—	—	—	—	—	—	—	—
Jack pine	—	—	—	—	—	4	14	—	14	1	11	—	—	—	—	—	—	—	—	—	—	—	—
White spruce	—	—	—	1	—	17	33	—	87	1	23	3	2	—	—	2	—	—	—	—	—	—	—
Black spruce	—	—	—	—	—	—	—	—	4	9	—	—	4	—	—	—	—	—	—	—	—	—	—
Balsam fir	—	—	—	—	—	2	8	—	8	—	6	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	—	—	—	—	—	4	12	—	16	9	9	—	4	—	—	—	—	—	—	—	—	—	—
Other softwoods	31	46	—	20	—	7	8	3	53	22	25	31	33	1	51	24	—	7	2	10	—	1	20
Total	31	46	—	21	—	41	98	3	206	43	92	34	43	1	51	26	—	7	2	10	—	1	20
HARDWOODS:																							
Select white oak	2,031	993	156	2,060	84	2,167	2,624	67	8,219	878	2,298	929	1,199	44	2,119	892	156	554	79	656	72	41	1,348
Select red oak	1,120	670	29	966	2	176	424	24	1,020	195	593	294	450	4	882	523	2	71	1	480	9	—	336
Other red oaks	50	23	1	47	—	—	1	1	36	11	6	7	21	—	28	23	—	1	—	22	—	—	15
Hickory	23	18	—	20	—	—	3	1	26	6	9	10	13	—	31	11	—	2	—	6	—	—	8
Hard maple	843	227	15	816	—	—	58	2	543	67	48	34	195	—	560	270	—	3	—	315	—	—	147
Soft maple	118	113	2	150	4	103	96	8	368	50	104	84	132	1	192	63	3	37	3	34	21	—	99
Ash	525	275	57	770	41	1,135	1,291	28	3,863	361	1,018	320	562	25	697	290	76	311	36	243	112	13	619
Balsam poplar	31	29	24	146	43	1,431	2,149	19	3,575	307	1,969	196	138	18	89	51	39	165	41	48	2	15	212
Paper birch	40	30	5	49	8	167	140	4	550	54	94	50	47	5	73	34	17	46	11	23	—	7	74
Bigtooth aspen	1	—	—	2	—	—	—	—	4	0	—	—	2	—	—	1	—	—	—	—	—	—	1
Quaking aspen	207	204	72	599	135	5,353	8,665	69	14,340	1,120	8,048	668	582	49	562	282	184	639	107	166	19	65	880
Basswood	1,960	850	122	1,986	30	715	785	36	2,780	306	749	520	814	31	1,672	755	32	316	21	768	131	8	750
Elm	2,267	1,034	180	2,805	106	2,468	2,381	77	8,459	717	1,807	962	1,553	69	2,545	959	162	793	94	899	314	28	1,691
Select hardwoods	136	59	3	149	2	54	54	2	187	18	48	29	64	1	115	50	2	16	2	56	11	—	54
Other hardwoods	615	388	124	904	68	1,638	1,458	41	4,564	629	1,049	646	771	71	766	330	68	533	112	281	206	47	752
Total	9,967	4,913	790	11,469	523	15,407	20,129	379	48,534	4,719	17,840	4,749	6,543	318	10,331	4,534	741	3,487	507	3,997	897	224	6,986
All species	9,998	4,959	790	11,490	524	15,448	20,227	382	48,740	4,762	17,932	4,783	6,586	319	10,382	4,560	741	3,494	509	4,007	897	225	7,006

Table 20.—*Net volume of sawtimber on commercial forest land by species and county, Prairie Unit, Minnesota, 1977*
(In thousand board feet)[1]

Species	All Counties	Big Stone	Blue Earth	Brown	Chippewa	Clay	Cotton-wood	Dodge	Faribault	Freeborn	Grant	Jackson	Kandiyoh	Kittson	Lac Qui Parle	Lincoln	Lyon	McLeod	Marshall	Martin
SOFTWOODS:																				
Red pine	3,167	—	—	—	—	—	—	—	—	—	—	—	—	1,198	—	—	—	—	1,500	—
Jack pine	1,100	—	—	—	—	—	—	—	—	—	—	—	—	416	—	—	—	—	521	—
White spruce	1,794	—	8	—	—	68	—	—	—	8	—	—	17	137	9	—	—	—	687	—
Balsam fir	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	447	—	—	—	—	—	—	—	—	—	—	—	—	169	—	—	—	—	212	—
Other softwoods	1,259	5	135	96	10	16	—	100	9	64	2	4	85	25	3	13	15	1	81	1
Total	7,767	5	143	96	10	84	—	100	9	72	2	4	102	1,945	12	13	15	1	3,001	1
HARDWOODS:																				
Select white oak	226,880	1,041	16,833	6,870	1,221	6,452	1,043	6,046	3,998	4,249	2,940	1,696	11,727	9,620	1,822	1,759	2,243	5,794	24,699	1,891
Select red oak	63,107	47	7,507	3,901	87	588	62	3,667	693	2,439	251	517	1,750	1,380	110	523	722	896	2,481	332
Other red oaks	2,403	1	246	125	—	214	—	110	8	76	92	37	34	—	—	16	21	25	41	10
Hickory	851	—	151	41	—	—	—	43	36	27	—	9	31	—	—	5	6	78	10	10
Hard maple	29,372	—	4,462	1,392	—	558	—	1,137	654	815	239	404	114	—	—	171	247	1,471	285	330
Soft maple	17,241	74	1,749	873	111	87	191	659	530	403	28	130	585	303	297	158	265	504	636	252
Ash	100,769	605	6,991	2,915	974	2,820	1,163	1,587	2,884	1,026	1,426	669	1,844	2,635	2,059	656	1,591	2,517	8,565	1,347
Balsam poplar	29,054	149	354	181	314	368	237	—	206	16	78	119	381	4,148	262	134	174	93	7,529	330
Paper birch	2,876	34	45	9	43	191	—	—	6	31	37	3	57	284	15	—	25	6	1,011	6
Quaking aspen	68,477	225	844	465	415	835	363	136	430	134	249	180	592	10,077	468	203	325	210	18,437	468
Basswood	148,474	585	17,264	6,895	791	1,077	925	5,668	4,015	3,787	455	1,328	4,626	2,203	1,720	1,150	2.364	4,930	5,973	1,564
Elm	270,859	1,437	23,224	9,325	2,113	6,192	2,536	6,035	7,855	3,974	2,945	2,001	7,092	6,208	4,713	1,842	3,991	8,285	18,529	3,383
Select hardwoods	5,339	3	756	326	—	—	15	251	104	175	—	59	45	—	32	40	69	141	19	55
Other hardwoods	134,628	1,111	7,913	4,511	1,496	3,635	1,328	2,759	2,872	1,967	794	746	4,150	5,244	2,537	841	2,079	1,353	20,066	1,415
Total	1,100,330	5,312	88,339	37,829	7,565	23,017	7,863	28,098	24,291	19,119	9,534	7,898	33,028	42,102	14,035	7,498	14,122	26,303	108,281	11,393
All species	1,108,097	5,317	88,482	37,925	7,575	23,101	7,863	28,198	24,300	19,191	9,536	7,902	33,130	44,047	14,047	7,511	14,137	26,304	111,282	11,394

[1]International ¼-inch rule.

(Table 20 continued on next page)

Table 20 Continued

Species	Meeker	Mower	Murray	Nicollet	Nobles	Norman	Pennington	Pipe-stone	Polk	Pope	Red Lake	Redwood	Renville	Rock	Sibley	Steele	Stevens	Swift	Traverse	Waseca	Watonwan	Wilkin	Yellow Medicine
SOFTWOODS:																							
Red pine	—	—	—	—	—	45	148	—	154	6	116	—	—	—	—	—	—	—	—	—	—	—	—
Jack pine	—	—	—	—	—	16	51	—	54	2	40	—	—	—	—	—	—	—	—	—	—	—	—
White spruce	—	—	—	8	—	86	165	—	452	6	110	17	8	—	—	8	—	—	—	—	—	—	—
Balsam fir	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	—	—	—	—	—	6	21	—	22	1	16	—	—	—	—	—	—	—	—	—	—	—	—
Other softwoods	44	66	1	28	1	13	14	4	85	35	39	45	48	1	73	35	1	10	3	15	—	1	30
Total	44	66	1	36	1	166	399	4	767	50	321	62	56	1	73	43	1	10	3	15	—	1	30
HARDWOODS:																							
Select white oak	9,258	4,460	722	9,010	279	7,033	8,371	253	31,043	2,990	7,237	3,849	4,955	157	9,289	3,936	600	2,085	243	2,954	354	117	5,741
Select red oak	5,432	2,880	154	4,765	10	532	1,223	93	3,753	746	1,884	1,163	1,931	19	3,949	2,402	7	301	5	2,363	50	—	1,492
Other red oaks	240	95	5	232	—	—	2	2	178	51	20	24	93	—	119	110	—	2	—	106	—	—	68
Hickory	51	29	—	48	—	—	12	2	77	10	17	18	24	—	80	15	—	3	—	6	—	—	12
Hard maple	3,778	1,085	75	3,528	—	—	185	6	1,532	141	185	139	729	—	2,268	1,239	—	12	—	1,566	—	—	625
Soft maple	547	471	18	756	35	742	615	40	2,093	257	587	409	614	10	907	275	26	218	22	157	95	2	510
Ash	2,822	1,382	342	4,092	221	4,859	4,335	142	16,786	1,387	2,950	1,639	2,760	136	3,849	1,439	383	1,651	161	1,273	622	37	3,227
Balsam poplar	37	62	47	274	88	2,087	2,431	41	4,404	444	2,191	356	264	32	165	83	67	302	69	88	—	11	438
Paper birch	23	—	3	17	3	151	125	—	412	57	77	34	9	6	21	14	19	49	15	9	—	20	9
Quaking aspen	173	175	61	575	115	4,235	6,607	59	10,790	905	6,257	547	543	42	437	202	120	493	91	156	52	32	754
Basswood	10,411	4,524	651	10,426	115	2,960	3,567	175	13,240	1,414	3,493	2,637	4,201	155	8,883	3,962	124	1,542	76	4,055	724	18	3,801
Elm	10,966	4,906	798	13,394	439	10,459	10,128	336	39,746	3,087	7,319	4,327	7,347	293	12,419	4,557	783	3,562	408	4,246	1,503	123	8,033
Select hardwoods	677	231	14	638	—	27	47	2	239	14	52	43	159	—	388	240	—	13	—	308	15	—	142
Other hardwoods	2,979	2,051	306	4,302	247	6,401	5,756	183	19,082	2,474	4,214	2,615	3,686	203	3,770	1,557	259	1,899	384	1,167	825	176	3,275
Total	47,394	22,351	3,196	52,057	1,552	39,486	43,404	1,334	143,375	13,977	36,483	17,800	27,315	1,053	46,544	20,031	2,388	12,132	1,474	18,454	4,240	536	28,127
All species	47,438	22,417	3,197	52,093	1,553	39,652	43,803	1,338	144,142	14,027	36,804	17,862	27,371	1,054	46,617	20,074	2,389	12,142	1,477	18,469	4,240	537	28,157

Table 21.— *Net volume of growing stock, sawtimber, short-log, and rough and rotten trees on commercial forest land by individual species, Prairie Unit, Minnesota, 1977*

Species	Total all live	Growing stock	Short-log	Rough and rotten	Sawtimber
	Thousand cubic feet				Thousand board feet[1]
SOFTWOODS:					
Red pine	492	492	—	—	3,167
Jack pine	292	292	—	—	1,100
White spruce	390	390	—	—	1,794
Black spruce	63	63	—	—	—
Balsam fir	174	174	—	—	—
Tamarack	313	313	—	—	447
Eastern redcedar	938	825	101	12	1,259
Total	2,662	2,549	101	12	7,767
HARDWOODS:					
White oak	1,706	1,432	241	33	7,392
Bur oak	66,100	58,617	3,094	4,389	219,488
Swamp white oak	—	—	—	—	—
Northern red oak	17,561	15,552	75	1,934	63,107
Black oak	—	—	—	—	—
Northern pin oak	522	522	—	—	2,403
Bitternut hickory	376	376	—	—	851
Shagbark hickory	36	—	—	36	—
Yellow birch	100	—	—	100	—
Sugar maple	8,794	7,484	610	700	29,372
Black maple	—	—	—	—	—
Red maple	206	206	—	—	412
Silver maple	4,851	3,129	198	1,524	16,829
White ash	385	356	—	29	2,730
Black ash	4,848	4,445	—	403	7,357
Green ash	22,421	18,932	755	2,734	90,682
Balsam poplar	29,332	25,779	383	3,170	29,054
Paper birch	3,287	3,048	—	239	2,876
Bigtooth aspen	27	27	—	—	—
Quaking aspen	123,202	97,199	1,939	24,064	68,477
Basswood	32,404	29,510	551	2,343	148,474
American elm	57,596	50,465	1,808	5,323	228,277
Slippery elm	8,508	7,839	47	622	39,641
Rock elm	756	556	—	200	2,941
Butternut	129	129	—	—	470
Black walnut	1,165	1,001	—	164	2,889
Black cherry	1,130	825	—	305	1,980
Boxelder	13,971	9,591	692	3,688	24,391
River birch	—	—	—	—	—
Hackberry	1,689	1,451	—	238	6,986
Eastern cottonwood	11,885	11,086	613	186	61,556
Black willow	10,152	9,676	84	392	40,464
Kentucky coffeetree	573	430	76	67	1,231
Noncommercial	1,929	—	—	1,929	—
Total	425,641	359,663	11,166	54,812	1,100,330
All species	428,303	362,212	11,267	54,824	1,108,097

[1]International ¼-inch rule.

Table 22.—*Net volume of growing stock on commercial forest land by species and diameter class, Prairie Unit, Minnesota, 1977*
(In thousand cubic feet)

Species	All classes	Diameter class (inches at breast height)											
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:													
Red pine	492	—	—	—	87	95	100	210	—	—	—	—	—
Jack pine	292	—	68	148	76	—	—	—	—	—	—	—	—
White spruce	390	59	—	—	—	111	—	220	—	—	—	—	—
Black spruce	63	63	—	—	—	—	—	—	—	—	—	—	—
Balsam fir	174	174	—	—	—	—	—	—	—	—	—	—	—
Tamarack	313	21	197	—	—	95	—	—	—	—	—	—	—
Other softwoods	825	403	126	213	—	83	—	—	—	—	—	—	—
Total	2,549	720	391	361	163	384	100	430	—	—	—	—	—
HARDWOODS:													
Select white oaks	60,049	3,181	5,010	9,586	10,801	8,183	8,278	4,879	4,012	2,569	3,000	550	—
Select red oaks	15,552	777	1,720	1,401	1,965	2,799	2,262	1,190	452	821	1,457	708	—
Other red oaks	522	65	—	—	—	84	140	—	50	148	35	—	—
Hickory	376	28	73	87	90	—	—	—	98	—	—	—	—
Hard maple	7,484	744	1,202	821	891	1,450	917	981	200	99	179	—	—
Soft maple	3,335	311	349	323	202	238	321	—	283	150	453	243	462
Ash	23,733	2,743	4,618	3,788	2,679	3,482	1,844	1,412	688	1,196	1,159	124	—
Balsam poplar	25,779	5,654	8,183	6,082	3,372	1,857	363	96	—	—	—	172	—
Paper birch	3,048	625	1,013	897	256	87	71	99	—	—	—	—	—
Bigtooth aspen	27	27	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	97,199	26,300	33,752	23,686	8,970	3,320	980	191	—	—	—	—	—
Basswood	29,510	534	1,074	2,008	3,846	4,660	5,024	5,354	2,707	1,923	2,132	247	—
Elm	58,860	2,710	3,446	4,306	3,562	5,006	7,546	5,121	5,223	4,837	10,200	5,704	1,200
Select hardwoods	1,955	80	602	328	147	273	—	317	—	79	129	—	—
Other hardwoods	32,234	3,089	4,379	4,973	3,740	3,361	1,588	1,518	1,808	1,910	1,466	2,290	2,112
Total	359,663	46,868	65,421	58,286	40,521	34,800	29,334	21,158	15,521	13,732	20,210	10,038	3,774
All species	362,212	47,588	65,812	58,647	40,684	35,184	29,434	21,588	15,521	13,732	20,210	10,038	3,774

Table 23.—*Net volume of sawtimber on commercial forest land by species and diameter class, Prairie Unit, Minnesota, 1977*
(In thousand board feet)[1]

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:											
Red pine	3,167	—	634	634	633	1,266	—	—	—	—	—
Jack pine	1,100	739	361	—	—	—	—	—	—	—	—
White spruce	1,794	—	—	660	—	1,134	—	—	—	—	—
Balsam fir	—	—	—	—	—	—	—	—	—	—	—
Tamarack	447	—	—	447	—	—	—	—	—	—	—
Other softwoods	1,259	986	—	273	—	—	—	—	—	—	—
Total	7,767	1,725	995	2,014	633	2,400	—	—	—	—	—
HARDWOODS:											
Select white oaks	226,880	—	58,228	44,256	44,411	25,523	21,236	14,356	16,041	2,829	—
Select red oaks	63,107	—	10,464	15,184	12,597	6,407	2,449	4,583	7,723	3,700	—
Other red oaks	2,403	—	—	464	791	—	252	717	179	—	—
Hickory	851	—	429	—	—	—	422	—	—	—	—
Hard maple	29,372	—	5,604	9,150	5,779	5,897	1,272	602	1,068	—	—
Soft maple	17,241	—	2,650	2,826	2,666	—	2,370	1,003	2,527	1,138	2,061
Ash	100,769	—	27,411	27,957	12,382	10,658	5,103	8,687	7,901	670	—
Balsam poplar	29,054	—	17,021	9,169	1,683	444	—	—	—	737	—
Paper birch	2,876	—	1,454	448	434	540	—	—	—	—	—
Quaking aspen	68,477	—	46,039	16,515	4,992	931	—	—	—	—	—
Basswood	148,474	—	22,124	26,540	29,316	30,663	15,487	10,703	12,310	1,331	—
Elm	270,859	—	19,659	28,021	43,007	28,894	29,685	26,954	56,720	31,070	6,849
Select hardwoods	5,339	—	626	1,327	—	2,374	—	542	470	—	—
Other hardwoods	134,628	—	30,836	25,262	11,425	10,895	12,218	11,879	9,155	12,523	10,435
Total	1,100,330	—	242,545	207,119	169,483	123,226	90,494	80,026	114,094	53,998	19,345
All species	1,108,097	1,725	243,540	209,133	170,116	125,626	90,494	80,026	114,094	53,998	19,345

[1]International ¼-inch rule.

Table 24.—*Net volume of growing stock on commercial forest land by species and forest type, Prairie Unit, Minnesota, 1977*
(In thousand cubic feet)

Species	All types	Forest type						
		Tamarack	Oak-hickory	Elm-ash-cottonwood	Maple-basswood	Aspen	Balsam poplar	Non-stocked
SOFTWOODS:								
Red pine	492	—	—	—	—	492	—	—
Jack pine	292	—	—	—	—	292	—	—
White spruce	390	—	—	—	—	390	—	—
Black spruce	63	63	—	—	—	—	—	—
Balsam fir	174	—	—	—	—	174	—	—
Tamarack	313	67	—	95	—	151	—	—
Other softwoods	825	—	685	—	140	—	—	—
Total	2,549	130	685	95	140	1,499	—	—
HARDWOODS:								
Select white oaks	60,049	—	33,922	844	14,094	11,061	48	80
Select red oaks	15,552	—	8,522	—	6,687	343	—	—
Other red oaks	522	—	298	—	224	—	—	—
Hickory	376	—	250	—	126	—	—	—
Hard maple	7,484	—	89	—	7,395	—	—	—
Soft maple	3,335	—	—	2,576	759	—	—	—
Ash	23,733	—	1,568	4,211	13,383	3,578	768	225
Balsam poplar	25,779	—	263	1,842	613	13,479	9,582	—
Paper birch	3,048	—	—	663	407	1,883	95	—
Bigtooth aspen	27	—	—	—	27	—	—	—
Quaking aspen	97,199	—	4,122	1,032	2,621	87,594	1,584	246
Basswood	29,510	—	2,820	654	25,629	407	—	—
Elm	58,860	—	2,911	7,661	45,906	1,370	1,012	—
Select hardwoods	1,955	—	954	299	702	—	—	—
Other hardwoods	32,234	—	843	24,635	5,279	1,264	213	—
Total	359,663	—	56,562	44,417	123,852	120,979	13,302	551
All species	362,212	130	57,247	44,512	123,992	122,478	13,302	551

Table 25.— *Net volume of sawtimber on commercial forest land by species and forest type, Prairie Unit Minnesota, 1977*
(In thousand board feet)[1]

Species	All types	Forest type					
		Oak-hickory	Elm-ash-cottonwood	Maple-basswood	Aspen	Balsam poplar	Non-stocked
SOFTWOODS:							
Red pine	3,167	—	—	—	3,167	—	—
Jack pine	1,100	—	—	—	1,100	—	—
White spruce	1,794	—	—	—	1,794	—	—
Tamarack	447	—	447	—	—	—	—
Other softwoods	1,259	985	—	274	—	—	—
Total	7,767	985	447	274	6,061	—	—
HARDWOODS:							
Select white oaks	226,880	129,237	4,659	63,827	28,740	—	417
Select red oaks	63,107	32,081	—	31,026	—	—	—
Other red oaks	2,403	1,182	—	1,221	—	—	—
Hickory	851	429	—	422	—	—	—
Hard maple	29,372	550	—	28,822	—	—	—
Soft maple	17,241	—	13,814	3,427	—	—	—
Ash	100,769	5,622	12,253	79,218	1,954	—	1,722
Balsam poplar	29,054	295	4,756	1,698	14,823	7,482	—
Paper birch	2,876	—	2,876	—	—	—	—
Quaking aspen	68,477	5,921	—	3,272	57,488	1,796	—
Basswood	148,474	15,107	2,011	130,671	685	—	—
Elm	270,859	13,587	30,909	220,341	3,249	2,773	—
Select hardwoods	5,339	2,184	226	2,929	—	—	—
Other hardwoods	134,628	2,624	107,164	21,369	3,471	—	—
Total	1,100,330	208,819	178,668	588,243	110,410	12,051	2,139
All species	1,108,097	209,804	179,115	588,517	116,471	12,051	2,139

[1]International ¼-inch rule.

Table 26.—*Net volume of growing stock on commercial forest land by species and ownership class, Prairie Unit, Minnesota, 1977*
(In thousand cubic feet)

Species	All owners	Ownership class							
		Misc. federal	State	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.	Misc. priv.-corp., leased	Misc. priv.-indiv., leased
SOFTWOODS:									
Red pine	492	—	492	—	—	—	—	—	—
Jack pine	292	—	292	—	—	—	—	—	—
White spruce	390	—	—	—	—	390	—	—	—
Black spruce	63	—	63	—	—	—	—	—	—
Balsam fir	174	—	—	—	174	—	—	—	—
Tamarack	313	—	67	—	151	—	95	—	—
Other	825	—	—	—	270	555	—	—	—
Total	2,549	—	914	—	985	555	95	—	—
HARDWOODS:									
Select white oaks	60,049	84	670	—	51,916	504	5,968	—	907
Select red oaks	15,552	—	—	602	10,874	—	4,076	—	—
Other red oaks	522	—	—	—	433	—	89	—	—
Hickory	376	—	—	—	376	—	—	—	—
Hard maple	7,484	—	—	—	5,345	—	2,139	—	—
Soft maple	3,335	—	—	—	3,335	—	—	—	—
Ash	23,733	—	746	187	17,598	102	4,888	—	212
Balsam poplar	25,779	949	4,287	104	18,294	357	1,680	108	—
Paper birch	3,048	—	108	95	2,455	—	390	—	—
Bigtooth aspen	27	—	—	—	27	—	—	—	—
Quaking aspen	97,199	1,574	11,754	347	73,045	449	9,958	72	—
Basswood	29,510	—	—	—	22,427	70	6,621	—	392
Elm	58,860	168	1,196	82	43,783	—	12,942	—	689
Select hardwoods	1,955	—	—	—	1,689	—	266	—	—
Other hardwoods	32,234	112	2,356	—	26,176	—	3,590	—	—
Total	359,663	2,887	21,117	1,417	277,773	1,482	52,607	180	2,200
All species	362,212	2,887	22,031	1,417	278,758	2,037	52,702	180	2,200

Table 27.—*Net volume of sawtimber on commercial forest land by species and ownership class, Prairie Unit Minnesota, 1977*
(In thousand board feet)[1]

Species	All owners	Ownership class							
		Misc. federal	State	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.	Misc. priv.-corp., leased	Misc. priv.-indiv., leased
SOFTWOODS:									
Red pine	3,167	—	3,167	—	—	—	—	—	—
Jack pine	1,100	—	1,100	—	—	—	—	—	—
White spruce	1,794	—	—	—	1,794	—	—	—	—
Tamarack	447	—	—	—	—	—	447	—	—
Other softwoods	1,259	—	—	—	642	617	—	—	—
Total	7,767	—	4,267	—	2,436	617	447	—	—
HARDWOODS:									
Select white oaks	226,880	444	964	—	196,808	1,725	22,585	—	4,354
Select red oaks	63,107	—	—	—	48,195	—	14,912	—	—
Other red oaks	2,403	—	—	—	1,918	—	485	—	—
Hickory	851	—	—	—	851	—	—	—	—
Hard maple	29,372	—	—	—	22,688	—	6,684	—	—
Soft maple	17,241	—	—	—	17,241	—	—	—	—
Ash	100,769	—	—	—	74,465	—	25,491	—	813
Balsam poplar	29,054	260	3,305	643	23,969	—	354	523	—
Paper birch	2,876	—	—	—	2,428	—	448	—	—
Quaking aspen	68,477	1,346	2,095	—	63,474	—	1,562	—	—
Basswood	148,474	—	—	—	115,444	379	30,870	—	1,781
Elm	270,859	973	5,851	—	203,819	—	57,285	—	2,931
Select hardwoods	5,339	—	—	—	3,641	—	1,698	—	—
Other hardwoods	134,628	—	6,716	—	110,067	—	17,845	—	—
Total	1,100,330	3,023	18,931	643	885,008	2,104	180,219	523	9,879
All species	1,108,097	3,023	23,198	643	887,444	2,721	180,666	523	9,879

[1]International ¼-inch rule.

Table 28.—*Net volume of growing stock on commercial forest land by forest type and stand-age class, Prairie Unit, Minnesota, 1977*
(In thousand cubic feet)

Forest type	All classes	Stand-age class (years)												
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Tamarack	130	—	130	—	—	—	—	—	—	—	—	—	—	—
Oak-hickory	57,247	1,495	—	—	2,098	4,286	2,391	7,457	9,831	15,172	12,412	2,105	—	—
Elm-ash-cottonwood	44,512	265	—	4,104	4,970	9,737	7,959	6,993	1,600	731	5,150	1,485	1,518	—
Maple-basswood	123,992	58	1,362	2,383	1,127	5,771	16,175	29,634	28,205	11,979	11,514	14,896	888	—
Aspen	122,478	10,915	10,898	10,587	30,039	40,158	10,047	5,651	3,510	673	—	—	—	—
Balsam poplar	13,302	1,737	432	1,044	3,511	4,203	593	1,782	—	—	—	—	—	—
Nonstocked	551	225	80	—	106	140	—	—	—	—	—	—	—	—
All types	362,212	14,695	12,902	18,118	41,851	64,295	37,165	51,517	43,146	28,555	29,076	18,486	2,406	—

Table 29.—*Net volume of sawtimber on commercial forest land by forest type and stand-age class, Prairie Unit, Minnesota, 1977*
(In thousand board feet)[1]

Forest type	All classes	Stand-age class (years)												
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Oak-hickory	209,804	6,631	—	—	3,859	12,054	4,924	25,167	32,237	57,636	56,459	10,837	—	—
Elm-ash-cottonwood	179,115	895	—	12,055	14,664	39,015	36,257	27,223	6,881	2,949	24,540	6,532	8,104	—
Maple-basswood	588,518	335	4,036	5,592	2,171	23,088	61,595	141,032	143,115	62,895	58,348	81,106	5,205	—
Aspen	116,471	6,999	13,208	9,015	19,096	44,450	11,336	7,923	2,049	2,395	—	—	—	—
Balsam poplar	12,051	551	—	643	4,377	2,687	—	3,793	—	—	—	—	—	—
Nonstocked	2,139	1,722	417	—	—	—	—	—	—	—	—	—	—	—
All types	1,108,098	17,133	17,661	27,305	44,167	121,294	114,112	205,138	184,282	125,875	139,347	98,475	13,309	—

[1] International ¼-inch rule.

Table 30.—*Net volume of short-log trees on commercial forest land by species and diameter class, Prairie Unit, Minnesota, 1977*
(In thousand cubic feet)

Species	All classes	Diameter class (inches at breast height)									
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:	101	101	—	—	—	—	—	—	—	—	—
HARDWOODS:											
Select white oaks	3,335	—	522	716	714	205	461	281	382	54	—
Select red oaks	75	—	—	75	—	—	—	—	—	—	—
Hard maple	610	—	169	190	66	—	71	—	114	—	—
Soft maple	198	—	—	126	—	—	72	—	—	—	—
Ash	755	—	238	328	46	97	—	—	—	46	—
Balsam poplar	383	—	346	—	—	—	—	—	—	—	37
Quaking aspen	1,939	—	916	777	246	—	—	—	—	—	—
Basswood	551	—	121	190	146	94	—	—	—	—	—
Elm	1,855	—	678	123	122	118	67	74	380	293	—
Other hardwoods	1,465	—	205	391	106	116	35	—	72	—	540
Total	11,166	—	3,195	2,916	1,446	630	706	355	948	393	577
All species	11,267	101	3,195	2,916	1,446	630	706	355	948	393	577

Table 31.—*Net volume of short-log trees on commercial forest land by species and diameter class, Prairie Unit, Minnesota, 1977*
(In thousand board feet)[1]

Species	All classes	Diameter class (inches at breast height)									
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:	574	574	—	—	—	—	—	—	—	—	—
HARDWOODS:											
Selectwhiteoaks	11,542	—	1,907	2,607	2,370	918	1,381	795	1,377	187	—
Select red oaks	224	—	—	224	—	—	—	—	—	—	—
Hard maple	1,583	—	318	513	127	—	146	—	479	—	—
Soft maple	925	—	—	690	—	—	235	—	—	—	—
Ash	2,000	—	706	766	82	198	—	—	—	248	—
Balsam poplar	940	—	457	—	—	—	—	—	—	—	483
Quaking aspen	3,329	—	1,665	1,214	450	—	—	—	—	—	—
Basswood	832	—	292	190	184	166	—	—	—	—	—
Elm	8,038	—	2,928	509	742	482	199	349	1,523	1,306	—
Other hardwoods	9,173	—	1,632	2,305	708	517	243	—	398	—	3,370
Total hardwoods	38,586	—	9,905	9,018	4,663	2,281	2,204	1,144	3,777	1,741	3,853
All species	39,160	574	9,905	9,018	4,663	2,281	2,204	1,144	3,777	1,741	3,853

[1]International ¼-inch rule.

Table 32.—*Net annual growth of growing stock on commercial forest land by softwoods and hardwoods, Prairie Unit, Minnesota, 1961 and 1976*

(In thousand cubic feet)

Species	1961[1]	1976
Softwoods	136	114
Hardwoods	11,931	11,820
All species	12,067	11,934

[1]Figures have been adjusted from those published after the 1962 survey to conform to 1977 volumes because of changes in survey definitions and procedures.

Table 33.—*Net annual growth of growing stock on commercial forest land by species and county, Prairie Unit, Minnesota, 1976*
(In thousand cubic feet)

Species	All Counties	Big Stone	Blue Earth	Brown	Chippewa	Clay	Cotton-wood	Dodge	Faribault	Freeborn	Grant	Jackson	Kandiyoh	Kittson	Lac Qui Parle	Lincoln	Lyon	McLeod	Marshall	Martin	Meeker	Mower
SOFTWOODS:																						
Red pine	18	—	—	—	—	—	—	—	—	—	—	—	—	7	—	—	—	—	8	—	—	—
Jack pine	13	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	6	—	—	—
White spruce	19	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	8	—	—	—
Black spruce	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—
Balsam fir	18	—	—	—	—	—	—	—	—	—	—	—	—	7	—	—	—	—	8	—	—	—
Tamarack	12	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—	—	7	—	—	—
Other softwoods	30	—	3	2	—	1	—	3	—	2	—	—	2	—	—	—	—	—	2	—	1	2
Total	114	—	3	2	—	1	—	3	—	2	—	—	2	26	—	—	—	—	42	—	1	2
HARDWOODS:																						
Select white oak	1,086	—	63	27	–5	14	5	24	16	17	12	7	30	99	5	16	17	23	157	8	33	18
Select red oak	441	—	42	25	—	2	—	25	3	16	1	4	14	29	—	5	4	3	43	1	25	18
Other red oaks	13	—	2	1	—	1	—	1	—	1	—	—	—	—	—	—	—	—	—	—	1	1
Hickory	14	—	3	1	—	—	—	1	—	1	—	—	1	—	—	—	—	—	—	—	2	1
Hard maple	492	—	73	18	—	24	—	15	14	10	10	8	3	—	—	3	3	33	9	6	51	14
Soft maple	127	—	14	9	1	—	1	9	2	6	—	1	7	1	1	1	2	1	3	1	4	6
Ash	313	1	8	—	4	15	–1	4	–3	4	7	1	7	36	–4	1	–1	5	78	1	5	4
Balsam poplar	1,266	–2	–6	–4	–4	10	–8	—	–6	1	–1	–4	–2	341	–5	–5	–4	–2	584	–10	1	–2
Paper birch	81	2	3	2	1	3	1	1	1	1	1	—	2	5	1	—	1	1	13	1	1	1
Bigtooth aspen	4	—	—	—	—	2	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	4,592	4	36	19	6	42	14	10	17	8	17	7	15	1,063	16	9	10	13	1,484	17	6	10
Basswood	1,617	7	168	69	11	22	11	56	39	38	8	14	44	35	18	12	24	46	90	18	100	45
Elm	850	5	50	3	13	45	–6	27	9	18	21	—	61	65	–7	3	—	45	187	–1	–27	11
Select hardwoods	57	—	6	2	—	—	1	2	2	1	—	—	1	2	2	—	1	2	3	1	2	1
Other hardwoods	867	11	38	17	17	25	9	10	18	8	6	4	27	45	17	5	7	7	156	9	14	8
Noncommercial species	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	11,820	28	500	189	44	205	27	185	112	130	83	42	210	1,721	44	42	64	177	2,807	52	218	136
All species	11,934	28	503	191	44	206	27	188	112	132	83	42	212	1,747	44	42	64	177	2,849	52	219	138

(Table 33 continued on next page)

(Table 33 continued)

Species	Murray	Nicollet	Nobles	Norman	Pennington	Pipe-stone	Polk	Pope	Red Lake	Redwood	Renville	Rock	Sibley	Steele	Stevens	Swift	Traverse	Waseca	Watonwan	Wilkin	Yellow Medicine
SOFTWOODS:																					
Red pine	—	—	—	—	1	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—
Jack pine	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
White spruce	—	—	—	1	2	—	4	—	1	—	—	—	—	—	—	—	—	—	—	—	—
Black spruce	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Balsam fir	—	—	—	—	1	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other softwoods	—	1	—	1	—	—	1	1	1	1	2	—	2	1	—	—	—	—	—	—	1
Total	—	1	—	2	5	—	9	2	4	1	2	—	2	1	—	—	—	—	—	—	1
HARDWOODS:																					
Select white oaks	2	36	1	42	74	1	161	5	72	13	21	–1	37	16	2	7	–3	10	1	–1	22
Select red oaks	1	21	—	6	15	1	32	6	20	9	12	—	23	13	—	2	—	11	—	—	9
Other red oaks	—	1	—	—	—	—	1	—	—	—	1	—	1	1	—	—	—	—	—	—	—
Hickory	—	1	—	—	—	—	1	—	—	—	1	—	1	—	—	—	—	—	—	—	—
Hard maple	1	51	—	—	4	—	40	5	3	2	13	—	36	16	—	—	—	18	—	—	9
Soft maple	—	4	—	3	3	—	11	5	5	4	5	—	8	3	—	1	—	1	—	—	4
Ash	1	–1	1	16	21	1	51	7	20	5	—	—	6	4	2	3	1	2	–3	—	4
Balsam poplar	–1	–7	–3	23	130	–1	156	8	129	–7	–6	—	–4	–1	–1	–7	—	–2	—	1	–13
Paper birch	—	2	—	6	4	—	14	1	3	1	1	—	2	1	—	1	—	1	—	—	2
Bigtooth aspen	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	2	24	4	206	399	3	610	33	345	21	23	—	23	13	6	18	—	4	1	—	34
Basswood	6	103	2	47	48	2	159	19	46	29	44	2	86	40	2	18	1	40	6	1	41
Elm	3	–46	1	20	42	2	172	24	44	27	2	2	36	–1	5	13	3	–24	–6	1	8
Select hardwoods	—	3	—	2	2	—	7	1	2	1	2	—	3	1	—	1	—	1	—	—	2
Other hardwoods	5	18	3	45	39	1	116	20	28	21	16	4	17	8	2	18	4	7	6	2	19
Noncommercial species	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	20	210	9	416	781	10	1,532	134	717	126	135	7	275	114	18	75	6	69	5	4	141
All species	20	211	9	418	786	10	1,541	136	721	127	137	7	277	115	18	75	6	69	5	4	142

Table 34.—*Net annual growth of sawtimber on commercial forest land by species and county, Prairie Unit, Minnesota, 1976*
(In thousand board feet)[1]

Species	All Counties	Big Stone	Blue Earth	Brown	Chippewa	Clay	Cotton-wood	Dodge	Faribault	Freeborn	Grant	Jackson	Kandiyoh	Kittson	Lac Qui Parle	Lincoln	Lyon	McLeod	Marshall	Martin	Meeker	Mower	Murray
SOFTWOODS:																							
Red pine	93	—	—	—	—	—	—	—	—	—	1	—	—	35	—	—	—	—	44	—	—	—	—
Jack pine	33	—	—	—	—	—	—	—	—	—	—	—	—	12	—	—	—	—	16	—	—	—	—
White spruce	58	—	—	—	—	2	—	—	—	—	—	—	—	7	—	—	—	—	21	—	—	—	—
Black spruce	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Balsam fir	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	13	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	6	—	—	—	—
Other softwoods	28	—	3	2	—	—	—	2	—	2	—	—	2	—	—	—	—	—	1	—	1	2	—
Total	225	—	3	2	—	2	—	2	—	2	1	—	2	59	—	—	—	—	88	—	1	2	—
HARDWOODS:																							
Select white oaks	4,515	—	267	119	–18	119	44	102	76	66	84	45	141	320	35	44	38	101	382	58	144	81	11
Select red oaks	2,573	1	258	158	2	13	1	157	19	102	6	13	96	118	2	21	26	16	199	6	144	114	5
Other red oaks	48	—	5	3	—	4	—	2	—	2	2	1	1	—	—	—	—	—	1	—	5	2	—
Hickory	22	—	3	1	—	—	—	2	1	1	—	—	1	—	—	—	—	1	—	—	1	2	—
Hard maple	2,263	—	393	75	—	32	—	62	89	44	14	33	8	—	—	9	13	207	33	34	251	58	4
Soft maple	3,047	1	386	278	3	2	3	290	27	183	1	12	213	7	4	39	40	5	14	4	126	194	—
Ash	1,208	7	79	33	10	39	13	17	33	11	20	7	20	32	24	8	17	30	110	16	32	15	3
Balsam poplar	3,094	12	29	16	25	22	22	—	19	1	6	11	28	450	22	13	15	8	772	30	2	6	4
Paper birch	34	—	1	—	1	2	—	—	—	—	—	—	1	5	—	—	—	—	12	—	—	—	—
Bigtooth aspen	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	6,621	5	191	139	7	–2	35	124	39	78	8	19	93	861	29	35	35	11	1,338	42	53	91	4
Basswood	7,086	27	817	333	37	52	43	276	184	184	21	62	205	120	78	54	111	224	301	74	491	220	29
Elm	2,210	–3	348	68	—	179	–70	212	39	138	94	–15	305	49	–79	3	–26	258	421	–58	–96	94	2
Select hardwoods	253	—	36	20	—	—	—	20	3	13	—	2	12	—	—	3	3	5	1	1	19	15	—
Other hardwoods	6,104	41	260	162	56	108	88	48	152	31	21	35	103	299	148	39	94	48	901	89	78	46	10
Noncommercial species	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	39,078	91	3,073	1,405	123	570	179	1,312	681	854	277	225	1,227	2,261	263	268	366	914	4,485	296	1,250	938	72
All species	39,303	91	3,076	1,407	123	572	179	1,314	681	856	278	225	1,229	2,320	263	268	366	914	4,573	296	1,251	940	72

[1]International ¼-inch rule.

(Table 34 continued on next page)

(Table 34 continued)

Species	Nicollet	Nobles	Norman	Pennington	Pipe-stone	Polk	Pope	Red Lake	Redwood	Renville	Rock	Sibley	Steele	Stevens	Swift	Traverse	Waseca	Watonwan	Wilkin	Yellow Medicine
SOFTWOODS:																				
Red pine	—	—	1	4	—	5	—	3	—	—	—	—	—	—	—	—	—	—	—	—
Jack pine	—	—	—	2	—	2	—	1	—	—	—	—	—	—	—	—	—	—	—	—
White spruce	—	—	4	6	—	14	—	4	—	—	—	—	—	—	—	—	—	—	—	—
Black spruce	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Balsam fir	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other softwoods	1	—	1	—	—	2	1	2	1	1	—	2	1	—	—	—	—	—	—	1
Total	1	—	6	13	—	24	1	10	1	1	—	2	1	—	—	—	—	—	—	1
HARDWOODS:																				
Select white oaks	186	9	213	253	9	693	23	237	68	115	–3	157	81	12	44	–16	39	5	–5	136
Select red oaks	119	—	36	92	5	197	40	129	58	78	—	140	78	—	12	—	58	1	—	53
Other red oaks	4	—	—	—	—	4	1	—	1	2	—	3	2	—	—	—	2	—	—	1
Hickory	1	—	—	—	—	2	—	1	1	1	—	2	1	—	—	—	—	—	—	—
Hard maple	244	—	—	27	—	173	9	16	9	45	—	201	65	—	1	—	81	—	—	33
Soft maple	87	1	15	21	11	184	67	99	121	139	—	214	103	1	25	1	39	1	—	86
Ash	47	3	59	54	2	216	16	36	18	32	1	45	17	5	18	2	15	7	—	39
Balsam poplar	25	8	226	318	4	492	45	301	30	23	2	15	7	6	27	5	7	—	—	40
Paper birch	—	—	2	3	—	4	1	2	—	—	—	—	—	—	—	—	—	—	—	—
Bigtooth aspen	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	76	10	387	665	10	986	77	673	82	91	–1	112	56	8	43	–3	22	2	–3	93
Basswood	491	6	147	178	9	627	70	179	127	201	7	420	191	6	73	4	194	33	1	179
Elm	–230	–11	–194	–18	5	485	71	35	97	8	4	237	3	14	7	3	–130	–32	5	–12
Select hardwoods	15	—	—	1	1	13	4	6	7	10	—	19	10	—	1	—	7	—	—	6
Other hardwoods	203	15	408	395	8	1,056	77	286	95	166	6	118	43	12	88	12	42	46	2	169
Noncommercial species	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	1,268	41	1,299	1,989	64	5,132	501	2,000	714	911	16	1,683	657	64	339	8	376	63	—	823
All species	1,269	41	1,305	2,002	64	5,156	502	2,010	715	912	16	1,685	658	64	339	8	376	63	—	824

Table 35.—*Net annual growth of growing stock on commercial forest land by species and ownership class, Prairie Unit, Minnesota, 1976*
(In thousand cubic feet)

Species	All owners	Ownership class							
		Misc. federal	State	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.	Misc. priv.-corp., leased	Misc. priv.-indiv., leased
SOFTWOODS:									
Red pine	18	—	18	—	—	—	—	—	—
Jack pine	13	—	13	—	—	—	—	—	—
White spruce	19	—	—	—	19	—	—	—	—
Black spruce	4	—	4	—	—	—	—	—	—
Balsam fir	18	—	—	—	18	—	—	—	—
Tamarack	12	—	2	—	6	—	4	—	—
Other softwoods	30	—	1	—	9	20	—	—	—
Total	114	—	38	—	52	20	4	—	—
HARDWOODS:									
Select white oaks	1,086	2	22	—	912	10	120	—	20
Select red oaks	441	—	—	29	296	—	116	—	—
Other red oaks	13	—	—	—	11	—	2	—	—
Hickory	14	—	—	—	14	—	—	—	—
Hard maple	492	—	—	—	347	—	145	—	—
Soft maple	127	—	—	—	127	—	—	—	—
Ash	313	—	27	7	178	3	93	—	5
Balsam poplar	1,266	60	287	6	437	29	440	7	—
Paper birch	81	—	3	5	62	—	11	—	—
Bigtooth aspen	4	—	—	—	4	—	—	—	—
Quaking aspen	4,592	100	997	28	2,478	34	947	8	—
Basswood	1,617	—	—	—	1,197	3	390	—	27
Elm	850	11	45	14	59	—	670	—	51
Select hardwoods	57	—	—	—	54	—	3	—	—
Other hardwoods	867	6	118	—	655	—	88	—	—
Noncommercial species	—	—	—	—	—	—	—	—	—
Total	11,820	179	1,499	89	6,831	79	3,025	15	103
All species	11,934	179	1,537	89	6,883	99	3,029	15	103

Table 36.—*Net annual growth of sawtimber on commercial forest land by species and ownership class, Prairie Unit, Minnesota, 1976*
(In thousand board feet)[1]

Species	All owners	Ownership class							
		Misc. federal	State	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.	Misc. priv.-corp., leased	Misc. priv.-indiv., leased
SOFTWOODS:									
Red pine	93	—	93	—	—	—	—	—	—
Jack pine	33	—	33	—	—	—	—	—	—
White spruce	58	—	—	—	58	—	—	—	—
Black spruce	—	—	—	—	—	—	—	—	—
Balsam fir	—	—	—	—	—	—	—	—	—
Tamarack	13	—	—	—	—	—	13	—	—
Other softwoods	28	—	—	—	15	13	—	—	—
Total	225	—	126	—	73	13	13	—	—
HARDWOODS:									
Select white oaks	4,515	9	544	—	3,062	30	781	—	89
Select red oaks	2,573	—	—	—	1,582	—	991	—	—
Other red oaks	48	—	—	—	38	—	10	—	—
Hickory	22	—	—	—	22	—	—	—	—
Hard maple	2,263	—	—	—	1,911	—	352	—	—
Soft maple	3,047	—	—	—	3,047	—	—	—	—
Ash	1,208	—	—	—	904	—	292	—	12
Balsam poplar	3,094	8	124	33	2,881	—	15	33	—
Paper birch	34	—	—	—	24	—	10	—	—
Bigtooth aspen	—	—	—	—	—	—	—	—	—
Quaking aspen	6,621	48	70	—	6,441	—	62	—	—
Basswood	7,086	—	—	—	5,497	15	1,473	—	101
Elm	2,210	62	173	—	–591	—	2,346	—	220
Select hardwoods	253	—	—	—	222	—	31	—	—
Other hardwoods	6,104	—	124	—	4,843	—	1,137	—	—
Noncommercial species	—	—	—	—	—	—	—	—	—
Total	39,078	127	1,035	33	29,883	45	7,500	33	422
All species	39,303	127	1,161	33	29,955	58	7,513	33	422

[1]International ¼-inch rule.

Table 37.—*Net annual growth of growing stock on commercial forest land by species and forest type, Prairie Unit, Minnesota, 1977*
(In thousand cubic feet)

Species	All types	Forest type						
		Tamarack	Oak-hickory	Elm-ash-cottonwood	Maple-basswood	Aspen	Balsam poplar	Non-stocked
SOFTWOODS:								
Red pine	18	—	—	—	—	18	—	—
Jack pine	13	—	—	—	—	13	—	—
White spruce	19	—	—	—	—	19	—	—
Black spruce	4	4	—	—	—	—	—	—
Balsam fir	18	—	—	—	—	18	—	—
Tamarack	12	2	—	4	—	6	—	—
Other softwoods	30	—	26	—	5	–1	—	—
Total	114	6	26	4	5	73	—	—
HARDWOODS:								
Select white oaks	1,086	—	513	13	263	295	1	1
Select red oaks	441	—	274	—	148	19	—	—
Other red oaks	13	—	9	—	4	—	—	—
Hickory	14	—	12	—	2	—	—	—
Hard maple	492	—	3	—	489	—	—	—
Soft maple	127	—	—	112	15	—	—	—
Ash	313	—	28	96	53	106	27	3
Balsam poplar	1,266	—	17	91	–660	878	940	—
Paper birch	81	—	—	7	14	55	5	—
Bigtooth aspen	4	—	—	—	4	—	—	—
Quaking aspen	4,592	—	70	–48	–55	4,607	106	–88
Basswood	1,617	—	150	43	1,397	27	—	—
Elm	850	—	–163	410	410	123	70	—
Select hardwoods	57	—	32	12	13	—	—	—
Other hardwoods	867	—	27	658	124	45	13	—
Noncommercial species	—	—	—	—	—	—	—	—
Total	11,820	—	972	1,394	2,221	6,155	1,162	–84
All species	11,934	6	998	1,398	2,226	6,228	1,162	–84

Table 38.—*Net annual growth of sawtimber on commercial forest land by species and forest type, Prairie Unit, Minnesota, 1976*
(In thousand board feet)[1]

Species	All types	Forest type					
		Oak-hickory	Elm-ash-cottonwood	Maple-basswood	Aspen	Balsam poplar	Non-stocked
SOFTWOODS:							
Red pine	93	—	—	—	93	—	—
Jack pine	33	—	—	—	33	—	—
White spruce	58	—	—	—	58	—	—
Black spruce	—	—	—	—	—	—	—
Balsam fir	—	—	—	—	—	—	—
Tamarack	13	—	13	—	—	—	—
Other softwoods	28	23	—	5	—	—	—
Total	225	23	13	5	184	—	—
HARDWOODS:							
Select white oaks	4,515	1,019	69	1,484	1,938	—	5
Select red oaks	2,573	1,950	—	623	—	—	—
Other red oaks	48	23	—	25	—	—	—
Hickory	22	16	—	6	—	—	—
Hard maple	2,263	18	—	2,245	—	—	—
Soft maple	3,047	—	3,011	36	—	—	—
Ash	1,208	61	163	927	36	—	21
Balsam poplar	3,094	8	174	62	1,942	908	—
Paper birch	34	—	34	—	—	—	—
Bigtooth aspen	—	—	—	—	—	—	—
Quaking aspen	6,621	782	—	–288	5,322	804	1
Basswood	7,086	758	92	6,195	41	—	—
Elm	2,210	–486	1,174	1,197	219	106	—
Select hardwoods	253	200	9	44	—	—	—
Other hardwoods	6,104	30	3,474	2,551	49	—	—
Noncommercial species	—	—	—	—	—	—	—
Total	39,078	4,379	8,200	15,107	9,547	1,818	27
All species	39,303	4,402	8,213	15,112	9,731	1,818	27

[1]International ¼-inch rule.

Table 39.—*Net annual growth of growing stock on commercial forest land by forest type and stand-age class, Prairie Unit, Minnesota, 1976*
(In thousand cubic feet)

Forest type	All classes	Stand-age class (years)												
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Red pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—
White pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Balsam fir	—	—	—	—	—	—	—	—	—	—	—	—	—	—
White spruce	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Black spruce	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Northern white-cedar	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	6	—	6	—	—	—	—	—	—	—	—	—	—	—
Oak-hickory	998	–100	—	—	–75	137	100	445	318	43	93	37	—	—
Elm-ash-cottonwood	1,398	8	—	191	204	275	226	196	57	27	140	31	43	—
Maple-basswood	2,226	4	28	–41	54	–454	833	892	793	480	–134	–265	36	—
Aspen	6,228	–501	975	835	1,997	1,956	535	277	135	19	—	—	—	—
Paper birch	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Balsam poplar	1,162	118	31	88	538	251	44	92	—	—	—	—	—	—
Nonstocked	–84	3	1	—	–98	10	—	—	—	—	—	—	—	—
All types	11,934	–468	1,041	1,073	2,620	2,175	1,738	1,902	1,303	569	99	–197	79	—

Table 40.—*Net annual growth of sawtimber on commercial forest land by forest type and stand-age class, Prairie Unit, Minnesota, 1976*
(In thousand board feet)[1]

Forest type	All classes	Stand-age class (years)												
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Red pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—
White pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Balsam fir	—	—	—	—	—	—	—	—	—	—	—	—	—	—
White spruce	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Black spruce	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Northern white-cedar	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Oak-hickory	4,402	–352	—	—	608	475	661	1,063	1,020	405	332	190	—	—
Elm-ash-cottonwood	8,213	23	—	300	317	4,343	1,210	1,094	130	100	418	108	170	—
Maple-basswood	15,112	22	–76	–774	691	609	3,021	4,970	5,758	3,601	–1,306	–1,611	207	—
Aspen	9,731	–507	441	320	2,313	4,972	1,003	1,084	58	47	—	—	—	—
Paper birch —	—	—	—	—	—	—	—	—	—	—	—	—	—	
Balsam poplar	1,818	19	—	33	141	95	—	1,530	—	—	—	—	—	—
Nonstocked	27	22	5	—	—	—	—	—	—	—	—	—	—	—
All types	39,303	–773	370	–121	4,070	10,494	5,895	9,741	6,966	4,153	–556	–1,313	377	—

[1]International ¼-inch rule

Table 41.—*Timber removals from growing stock and sawtimber on commercial forest land by species, Prairie Unit, Minnesota, 1962 and 1976*

Species	Growing stock		Sawtimber	
	1962	1976	1962	1976
	Thousand cubic feet		*Thousand board feet*[1]	
SOFTWOODS:				
White pine	3	—	17	—
Red pine	12	20	38	64
Jackpine	5	9	9	17
Spruce	52	16	165	33
Balsam fir	62	6	87	—
Tamarack	19	49	55	87
Northern white-cedar	—	18	—	24
Other softwoods	23	38	19	32
Total	176	156	390	257
HARDWOODS:				
White oak	870	1,378	2,589	2,623
Red oak	425	447	1,305	989
Yellow birch	1	—	5	—
Hard maple	102	228	255	479
Soft maple	73	138	231	394
Ash	313	631	752	1,350
Paper birch	50	55	65	14
Aspen	1,676	1,444	2,296	537
Basswood	389	676	1,339	1,889
Elm	758	1,936	2,491	5,081
Other hardwoods	1,410	1,638	4,579	4,260
Total	6,067	8,571	15,907	17,616
All species	6,243	8,727	16,297	17,873

[1]International ¼-inch rule.

Table 42.—*Timber removals from growing stock on commercial forest land by species and county, Prairie Unit, Minnesota, 1976*
(In thousand cubic feet)

Species	All counties	Big Stone	Blue Earth	Brown	Chippewa	Clay	Cottonwood	Dodge	Faribault	Freeborn	Grant	Jackson	Kandiyohi	Kittson	Lac qui Parle	Lincoln	Lyon
SOFTWOODS:																	
Red pine	20	—	—	—	—	—	—	—	—	—	—	—	—	7	—	—	—
Jack pine	9	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—
White spruce	15	—	—	—	—	1	—	—	—	—	—	—	—	1	—	—	—
Black spruce	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Balsam Fir	6	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—
Tamarack	49	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—
Northern white-cedar	18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other softwoods	38	—	43	3	—	—	—	3	—	2	—	—	3	2	—	—	—
Total	156	—	43	3	—	1	—	3	—	2	—	—	3	21	—	—	—
HARDWOODS:																	
Select white oak	1,378	7	102	46	8	40	6	37	32	32	17	10	70	68	11	9	12
Select red oak	431	—	44	25	1	1	—	24	8	18	1	3	17	9	1	3	4
Other red oak	16	—	1	1	—	1	—	1	—	1	1	—	—	—	—	—	—
Hickory	11	—	1	1	—	—	—	1	—	1	—	—	1	—	—	—	—
Hard maple	228	—	29	10	—	5	—	8	8	7	3	3	4	1	—	1	1
Soft maple	138	—	12	7	—	—	1	5	5	6	—	1	6	1	1	1	1
Ash	631	9	31	14	10	10	12	8	13	6	13	11	11	19	18	9	16
Balsam poplar	372	2	5	2	4	4	3	—	3	1	1	1	5	63	3	1	2
Paper birch	55	1	3	1	1	2	—	1	1	1	1	—	2	3	1	1	1
Bigtooth aspen	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	1,444	6	23	11	11	19	9	4	10	5	11	4	16	228	11	5	9
Basswood	676	3	76	30	4	4	5	24	18	16	3	6	21	7	8	5	11
Elm	1,936	18	130	60	24	18	27	39	48	32	26	25	49	23	39	21	37
Cottonwood	578	2	1	1	25	45	3	2	84	1	3	3	2	—	3	3	3
Black walnut	12	—	2	5	—	—	—	—	1	—	—	—	—	—	—	—	—
Other hardwoods	665	10	41	22	14	12	11	13	18	10	8	7	25	19	18	8	16
Total	8,571	58	501	236	102	161	77	167	249	137	88	74	229	441	114	67	113
All species	8,727	58	505	239	102	162	77	170	249	139	88	74	232	462	114	67	113

(Table 42 continued on next page)

(Table 42 continued)

Species	McLeod	Marshall	Martin	Meeker	Mower	Murray	Nicollet	Nobles	Norman	Pennington	Pipestone	Polk	Pope	Red Lake	Redwood	Renville	Rock	Sibley
SOFTWOODS:																		
Red pine	—	10	—	—	—	—	—	—	—	1	—	1	—	1	—	—	—	—
Jack pine	—	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
White spruce	—	7	—	—	—	—	—	—	1	1	—	3	—	1	—	—	—	—
Black spruce	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Balsam Fir	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	—	7	—	—	—	—	—	—	—	2	—	36	—	—	—	—	—	—
Northern white-cedar	—	9	—	—	—	—	—	—	—	—	—	9	—	—	—	—	—	—
Other softwoods	—	3	—	1	2	—	1	—	—	—	—	3	2	2	1	2	—	1
Total	—	45	—	1	2	—	1	—	1	4	—	52	2	4	1	2	—	1
HARDWOODS:																		
Select white oak	46	136	12	65	33	4	61	2	44	43	1	119	31	35	22	43	1	58
Select red oak	12	15	1	37	22	1	39	—	2	5	1	20	10	10	6	18	—	24
Other red oak	—	—	—	1	1	—	2	—	—	—	—	1	—	—	—	1	—	1
Hickory	1	—	—	1	1	—	1	—	—	—	—	1	—	—	—	—	—	1
Hard maple	13	3	2	23	8	1	29	—	1	1	—	9	4	1	1	9	—	17
Soft maple	16	5	1	12	6	—	9	—	1	1	—	9	4	1	3	6	—	6
Ash	23	44	15	27	7	10	26	10	16	18	7	58	10	13	17	15	7	17
Balsam poplar	1	108	4	1	1	1	3	1	18	28	1	47	7	26	5	3	1	2
Paper birch	1	7	1	1	1	—	1	—	2	2	—	7	1	1	1	1	—	2
Bigtooth aspen	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	8	390	13	6	5	2	14	4	74	117	1	196	26	108	16	14	1	13
Basswood	45	18	7	54	20	2	67	1	9	11	1	36	7	10	13	20	1	39
Elm	219	61	33	154	35	19	99	18	35	32	12	163	27	24	45	51	11	73
Cottonwood	137	3	3	63	1	3	8	3	31	1	2	81	1	—	6	5	2	4
Black walnut	—	—	—	—	—	—	2	—	—	—	—	—	—	—	2	—	—	—
Other hardwoods	8	69	11	16	11	5	22	4	21	19	3	59	17	14	19	21	3	19
Total	530	859	103	461	152	48	383	43	254	278	29	806	145	243	156	207	27	276
All species	530	904	103	462	154	48	384	43	255	282	29	858	147	247	157	209	27	277

(Table 42 continued on next page)

(Table 42 continued)

Species	Steele	Stevens	Swift	Traverse	Waseca	Watonwan	Wilkin	Yellow Medicine
SOFTWOODS:								
Red pine	—	—	—	—	—	—	—	—
Jack pine	—	—	—	—	—	—	—	—
White spruce	—	—	—	—	—	—	—	—
Black spruce	—	—	—	—	—	—	—	—
Balsam Fir	—	—	—	—	—	—	—	—
Tamarack	—	—	—	—	—	—	—	—
Northern white-cedar	—	—	—	—	—	—	—	—
Other softwoods	2	—	—	—	—	—	—	1
Total	2	—	—	—	—	—	—	1
HARDWOODS:								
Select white oak	28	3	13	2	24	2	12	31
Select red oak	18	—	2	—	19	—	2	8
Other red oak	1	—	—	—	1	—	—	1
Hickory	—	—	—	—	—	—	—	—
Hard maple	10	—	—	—	12	—	1	3
Soft maple	2	—	1	—	4	1	—	3
Ash	9	8	16	7	9	7	1	24
Balsam poplar	1	1	4	1	1	—	1	5
Paper birch	1	1	1	—	1	—	—	2
Bigtooth aspen	—	—	—	—	—	—	—	—
Quaking aspen	7	4	15	2	4	1	1	20
Basswood	20	1	7	1	24	3	—	18
Elm	35	16	34	13	37	16	2	56
Cottonwood	3	3	23	3	3	2	1	5
Black walnut	—	—	—	—	—	—	—	—
Other hardwoods	9	4	16	6	8	7	1	21
Total	144	41	132	35	147	39	22	197
All species	146	41	132	35	147	39	22	198

Table 43.—*Timber removals from sawtimber on commercial forest land by species and county, Prairie Unit, Minnesota, 1976*
(In thousand board feet)[1]

Species	All counties	Big Stone	Blue Earth	Brown	Chippewa	Clay	Cottonwood	Dodge	Faribault	Freeborn	Grant	Jackson	Kandiyohi	Kittson	Lac qui Parle	Lincoln	Lyon
SOFTWOODS:																	
Red pine	64	—	—	—	—	—	—	—	—	—	—	—	—	23	—	—	—
Jack pine	17	—	—	—	—	—	—	—	—	—	—	—	—	8	—	—	—
White spruce	33	—	—	—	—	2	—	—	—	—	—	—	—	2	—	—	—
Black spruce	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Balsam Fir	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	87	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—
Northern white-cedar	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other softwoods	32	—	3	2	—	—	—	2	—	2	—	—	2	2	—	—	—
Total	257	—	3	2	—	2	—	2	—	2	—	—	2	38	—	—	—
HARDWOODS:																	
Select white oak	2,623	13	190	85	15	69	11	68	58	56	32	19	126	121	21	17	23
Select red oak	948	—	88	52	2	2	—	54	15	33	2	6	30	18	2	6	8
Other red oak	41	—	2	2	—	2	—	2	—	2	2	—	—	—	—	—	—
Hickory	13	—	1	1	—	—	—	1	—	1	—	—	1	—	—	—	—
Hard maple	479	—	55	17	—	10	—	15	14	12	6	6	6	2	—	2	2
Soft maple	394	—	26	15	—	—	3	12	11	12	—	3	13	3	3	3	3
Ash	1,350	14	66	30	17	21	22	16	27	13	24	17	21	40	31	15	27
Balsam poplar	218	1	3	1	2	2	2	—	2	1	1	1	3	36	2	1	1
Paper birch	14	—	1	—	—	1	—	—	—	—	—	—	1	1	—	—	—
Bigtooth aspen	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	537	2	8	4	4	7	3	1	4	2	4	1	6	83	4	2	3
Basswood	1,889	8	192	76	10	10	13	61	46	41	8	15	51	18	20	13	28
Elm	5,081	32	293	133	45	41	51	87	105	70	48	44	101	53	75	38	70
Cottonwood	2,622	3	2	2	113	224	4	7	417	2	3	4	4	—	4	3	5
Black walnut	76	—	13	25	—	—	—	—	9	—	—	—	—	—	—	—	—
Other hardwoods	1,331	18	84	44	27	25	21	27	36	19	14	12	51	40	36	13	31
Total	17,616	91	1,024	487	235	414	130	351	744	264	144	128	414	415	198	113	201
All species	17,873	91	1,027	489	235	416	130	353	744	266	144	128	416	453	198	113	201

[1]International ¼-inch rule.

(Table 43 continued on next page)

(Table 43 continued)

Species	McLeod	Marshall	Martin	Meeker	Mower	Murray	Nicollet	Nobles	Norman	Pennington	Pipestone	Polk	Pope	Red Lake	Redwood	Renville	Rock	Sibley
SOFTWOODS:																		
Red pine	—	32	—	—	—	—	—	—	—	3	—	3	—	3	—	—	—	—
Jack pine	—	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
White spruce	—	16	—	—	—	—	—	—	2	2	—	7	—	2	—	—	—	—
Black spruce	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Balsam Fir	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	—	5	—	—	—	—	—	—	—	1	—	78	—	—	—	—	—	—
Northern white-cedar	—	11	—	—	—	—	—	—	—	—	—	13	—	—	—	—	—	—
Other softwoods	—	2	—	1	2	—	1	—	—	—	—	2	2	2	1	2	—	1
Total	—	75	—	1	2	—	1	—	2	6	—	103	2	7	1	2	—	1
HARDWOODS:																		
Select white oak	105	275	23	151	57	8	133	4	78	79	2	219	54	64	42	73	2	105
Select red oak	35	30	2	92	47	2	121	—	4	10	2	41	17	19	12	32	—	47
Other red oak	1	—	—	4	3	—	6	—	—	—	—	3	—	—	—	2	—	2
Hickory	1	—	—	1	1	—	1	—	—	—	—	2	—	—	—	—	—	2
Hard maple	26	5	4	42	14	2	81	—	1	2	—	17	6	3	2	16	—	38
Soft maple	69	9	3	51	11	—	34	—	3	3	—	19	7	3	10	12	—	15
Ash	83	93	25	93	15	13	75	14	34	37	9	147	21	29	29	31	10	36
Balsam poplar	1	61	2	1	1	1	2	1	10	16	1	26	4	15	3	2	1	1
Paper birch	—	3	—	—	—	—	—	—	1	1	—	3	—	—	—	—	—	1
Bigtooth aspen	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Quaking aspen	8	142	5	8	2	1	5	1	28	43	—	74	9	40	6	5	—	5
Basswood	175	45	18	162	54	5	223	3	23	30	3	91	19	25	35	49	3	99
Elm	962	140	63	581	74	30	285	28	80	72	19	507	54	56	98	113	15	172
Cottonwood	685	3	4	311	2	4	38	4	155	1	3	394	2	1	15	22	3	20
Black walnut	—	—	—	—	—	—	9	—	—	—	—	—	—	—	15	—	—	—
Other hardwoods	17	144	22	31	21	8	46	7	44	40	5	123	33	29	37	41	5	40
Total	2,168	950	171	1,528	302	74	1,059	62	461	334	44	1,266	226	284	304	398	39	583
All species	2,168	1,025	171	1,529	304	74	1,060	62	463	340	44	1,769	228	291	305	400	39	584

(Table 43 continued on next page)

(Table 43 continued)

Species	Steele	Stevens	Swift	Traverse	Waseca	Watonwan	Wilkin	Yellow Medicine
SOFTWOODS:								
Red pine	—	—	—	—	—	—	—	—
Jack pine	—	—	—	—	—	—	—	—
White spruce	—	—	—	—	—	—	—	—
Black spruce	—	—	—	—	—	—	—	—
Balsam Fir	—	—	—	—	—	—	—	—
Tamarack	—	—	—	—	—	—	—	—
Northern white-cedar	—	—	—	—	—	—	—	—
Other softwoods	2	—	—	—	—	—	—	1
Total	2	—	—	—	—	—	—	1
HARDWOODS:								
Select white oak	54	6	25	4	56	4	17	59
Select red oak	43	—	4	—	49	—	5	16
Other red oak	3	—	—	—	3	—	—	2
Hickory	—	—	—	—	—	—	—	—
Hard maple	27	—	—	—	39	—	1	6
Soft maple	10	—	3	—	14	3	—	8
Ash	21	13	27	11	26	11	2	44
Balsam poplar	1	1	2	1	1	—	1	3
Paper birch	—	—	—	—	—	—	—	1
Bigtooth aspen	—	—	—	—	—	—	—	—
Quaking aspen	2	1	5	1	1	—	—	7
Basswood	61	3	18	3	79	8	—	45
Elm	86	25	65	20	102	29	4	115
Cottonwood	12	3	104	3	18	3	1	14
Black walnut	2	—	—	—	3	—	—	—
Other hardwoods	18	6	32	10	16	13	2	43
Total	340	58	285	53	407	71	33	363
All species	342	58	285	53	407	71	33	364

[1]International ¼-inch rule.

Table 44.—*Timber removals from growing stock and sawtimber on commercial forest land by item and species group, Prairie Unit, Minnesota, 1976*

Item	Growing stock						Sawtimber					
	All species	Jack pine	Spruce	Other soft-woods	Aspen	Other hard-woods	All species	Jack pine	Spruce	Other soft-woods	Aspen	Other hard-woods
	Thousand cubic feet						Thousand board feet[1]					
Roundwood Products:												
Pulpwood	34	—	—	34	—	—	77	—	—	77	—	—
Saw logs	869	—	—	—	2	867	4,675	—	—	—	12	4,663
Fuelwood	1,119	—	—	18	17	1,084	1,563	—	—	24	24	1,515
Posts	30	—	—	—	—	30	62	—	—	—	—	62
Veneer logs	46	—	—	—	—	46	331	—	—	—	—	331
Poles	—	—	—	—	—	—	—	—	—	—	—	—
Other[2]	—	—	—	—	—	—	—	—	—	—	—	—
All products	2,098	—	—	52	19	2,027	6,708	—	—	101	36	6,571
Logging residue	167	—	—	1	—	166	552	—	—	—	—	552
Other removals	6,462	9	16	78	1,425	4,934	10,613	17	33	106	501	9,956
Total removals	8,727	9	16	131	1,444	7,127	17,873	17	33	207	537	17,079

[1]International ¼-inch rule.

[2]Includes match bolts, particleboard bolts, shavings bolts, piling, lath bolts, etc.

Table 45.—*Timber removals from growing stock by ownership class and softwoods and hardwoods, Prairie Unit, Minnesota, 1976*

(In thousand cubic feet)

Ownership class	All species	Softwoods	Hardwoods
National forest	—	—	—
Other federal	317	1	316
State	5	(1)	5
County	—	—	—
Forest industry	—	—	—
Farmer and miscellaneous private	8,405	155	8,250
All ownerships	8,727	156	8,571

[1]Small quantity rounded off to zero.

Table 46.—*Timber removals from sawtimber by ownership class and softwoods and hardwoods, Prairie Unit, Minnesota, 1976*

(In thousand board feet)[1]

Ownership class	All species	Softwoods	Hardwoods
National forest	—	—	—
Other federal	522	2	520
State	17	(2)	17
County	—	—	—
Forest industry	—	—	—
Farmer and miscellaneous private	17,334	255	17,079
All ownerships	17,873	257	17,616

[1]International ¼-inch rule.

[2]Small quantity rounded off to zero.

Table 47.—*Annual mortality of growing stock on commercial forest land by species and cause, Prairie Unit, Minnesota, 1976*
(In thousand cubic feet)

Species	All causes	Cause				
		Insects	Disease	Fire	Weather	Unknown and other
SOFTWOODS:						
White pine	—	—	—	—	—	—
Red pine	—	—	—	—	—	—
Jack pine	—	—	—	—	—	—
White spruce	—	—	—	—	—	—
Black spruce	—	—	—	—	—	—
Balsam fir	—	—	—	—	—	—
Tamarack	—	—	—	—	—	—
Northern white-cedar	—	—	—	—	—	—
Other softwoods	—	—	—	—	—	—
Total	—	—	—	—	—	—
HARDWOODS:						
Select white oaks	342	—	—	—	342	—
Select red oaks	—	—	—	—	—	—
Other red oaks	—	—	—	—	—	—
Hickory	—	—	—	—	—	—
Yellow birch	—	—	—	—	—	—
Hard maple	—	—	—	—	—	—
Soft maple	—	—	—	—	—	—
Ash	196	—	—	—	—	196
Balsam poplar	692	—	692	—	—	—
Paper birch	—	—	—	—	—	—
Bigtooth aspen	—	—	—	—	—	—
Quaking aspen	2,777	—	1,501	1,154	—	122
Basswood	—	—	—	—	—	—
Elm	2,223	—	2,223	—	—	—
Select hardwoods	—	—	—	—	—	—
Other hardwoods	—	—	—	—	—	—
Noncommercial species	—	—	—	—	—	—
Total	6,230	—	4,416	1,154	342	318
All species	6,230	—	4,416	1,154	342	318

Table 48.—*Annual mortality of growing stock on commercial forest land by species and cause, Prairie Unit, Minnesota, 1976*

(In thousand board feet)[1]

Species	All causes	Cause	
		Disease	Weather
SOFTWOODS:			
White pine	—	—	—
Red pine	—	—	—
Jack pine	—	—	—
White spruce	—	—	—
Black spruce	—	—	—
Balsam fir	—	—	—
Tamarack	—	—	—
Northern white-cedar	—	—	—
Other softwoods	—	—	—
Total	—	—	—
HARDWOODS:			
Select white oaks	1,820	—	1,820
Select red oaks	—	—	—
Other red oaks	—	—	—
Hickory	—	—	—
Yellow birch	—	—	—
Hard maple	—	—	—
Soft maple	—	—	—
Ash	—	—	—
Balsam poplar	—	—	—
Paper birch	—	—	—
Bigtooth aspen	—	—	—
Quaking aspen	3,219	3,219	—
Basswood	—	—	—
Elm	10,772	10,772	—
Select hardwoods	—	—	—
Other hardwoods	—	—	—
Noncommercial species	—	—	—
Total	15,811	13,991	1,820
All species	15,811	13,991	1,820

[1]International ¼-inch rule.

Table 49.—*Annual mortality of growing stock and sawtimber on commercial forest land by ownership class and softwoods and hardwoods, Prairie Unit, Minnesota, 1976*

Ownership class	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	Thousand cubic feet			*Thousand board feet*[1]		
National forest	—	—	—	—	—	—
Bureau of land mgmt.	—	—	—	—	—	—
Indian	—	—	—	—	—	—
Miscellaneous federal	—	—	—	—	—	—
State	115	—	115	—	—	—
County and municipal	—	—	—	—	—	—
Forest industry	—	—	—	—	—	—
Farmer	6,115	—	6,115	15,811	—	15,811
Farmer-owned leased	—	—	—	—	—	—
Misc.—private-corp.	—	—	—	—	—	—
Misc.—private-indiv.	—	—	—	—	—	—
Misc.—priv.-corp., leased	—	—	—	—	—	—
Misc.—priv.-ind., leased	—	—	—	—	—	—
All owners	6,230	—	6,230	15,811	—	15,811

[1]International ¼-inch rule.

Table 50.—*Output of timber products by source of material and softwoods and hardwoods, Prairie Unit, Minnesota, 1975*

Product and species group	Standard unit	Total		Roundwood products				Plant byproducts	
				Growing stock		Nongrowing stock			
		No. of units	*Thousand cubic feet*	*No. of units*	*Thousand cubic feet*	*No. of units*	*Thousand cubic feet*	*No. of units*	*Thousand cubic feet*
Pulpwood:	Standard								
Softwood	cords	457	35	444	34	13	1	—	—
Hardwood		506	40	—	—	—	—	506	40
Total		963	75	444	34	13	1	506	40
Fuelwood:	Standard								
Softwood	cords	586	40	264	18	308	21	14	1
Hardwood		38,840	2,619	16,367	1,101	20,173	1,357	2,300	161
Total		39,426	2,659	16,631	1,119	20,481	1,378	2,314	162
Posts:	Thousand								
Softwood	pieces	—	—	—	—	—	—	—	—
Hardwood		46	48	29	30	17	18	—	—
Total		46	48	29	30	17	18	—	—
Veneer logs:	Thousand								
Softwood	board feet[1]	—	—	—	—	—	—	—	—
Hardwood		346	48	332	46	14	2	—	—
Total		346	48	332	46	14	2	—	—
Poles:	Pieces								
Softwood		—	—	—	—	—	—	—	—
Hardwood		—	—	—	—	—	—	—	—
Total		—	—	—	—	—	—	—	—
Saw logs:	Thousand								
Softwood	board feet[1]	—	—	—	—	—	—	—	—
Hardwood		5,230	900	5,050	869	180	31	—	—
Total		5,230	900	5,050	869	180	31	—	—
Other[2]:	Thousand								
Softwood	cubic feet	—	—	—	—	—	—	—	—
Hardwood		51	51	—	—	—	—	51	51
Total		51	51	—	—	—	—	51	51
All products:	Thousand								
Softwood	cubic feet	75	75	52	52	22	22	1	1
Hardwood		3,706	3,706	2,046	2,046	1,408	1,408	252	252
Total		3,781	3,781	2,098	2,098	1,430	1,430	253	253

[1]International ¼-inch rule.

[2]Other (industrial production) includes match bolts, shaving bolts, particleboard bolts, lath bolts, piling, etc.

Table 51.—*Forest products harvested, by ownership class and product, Prairie Unit, Minnesota, 1975*

Ownership class	Pulpwood	Saw logs	Fuelwood	Posts	Poles	Other
	Cords[1]	*[2]Thousand board feet*	*Cords*[1]	*Thousand pieces*	*Pieces*	*Thousand cubic feet*
Federal:						
National forest:						
Softwoods	—	—	—	—	—	—
Hardwoods	—	—	—	—	—	—
Total	—	—	—	—	—	—
Other federal:						
Softwoods	—	—	—	—	—	—
Hardwoods	—	—	—	—	—	—
Total	—	—	—	—	—	—
State:						
Softwoods	2	—	—	—	—	—
Hardwoods	—	15	52	—	—	—
Total	2	15	52	—	—	—
County:						
Softwoods	—	—	—	—	—	—
Hardwoods	—	—	—	—	—	—
Total	—	—	—	—	—	—
Private:						
Forest industry:						
Softwoods	—	—	—	—	—	—
Hardwoods	—	—	—	—	—	—
Total	—	—	—	—	—	—
Farm and other:						
Softwoods	455	—	572	—	—	—
Hardwoods	—	5,215	36,488	46	—	48
Total	455	5,215	37,060	46	—	48
All owners:						
Softwoods	457	—	572	—	—	—
Hardwoods	—	5,230	36,540	46	—	48
Total	457	5,230	37,112	46	—	48

[1]Standard cords, rough wood basis.

[2]International ¼-inch rule.

Table 52.—*Volume of primary plant residue, by kind of material and type of use, Prairie Unit, Minnesota, 197*
(In thousand cubic feet)

Type of use	Kind of wood residue							
	Total		Coarse[1]		Fine[2]		Bark[3]	
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Fiber products[4]	—	—	—	—	—	—	—	—
Industrial fuel	—	—	—	—	—	—	—	—
Domestic fuel	0.6	160.6	0.6	154.8	—	5.8	0.4	98.3
Miscellaneous[5]	—	51.1	—	0.5	—	50.6	—	0.3
Not used[6]	3.4	86.6	1.9	31.4	1.5	55.2	1.2	23.1
Total	4.0	298.3	2.5	186.7	1.5	111.6	1.6	121.7

[1]Suitable for chipping such as slabs, edging, veneer cores, etc.

[2]Not suitable for chipping such as sawdust, veneer clippings, etc.

[3]Does not include bark disposal at pulpmills.

[4]For manufacture of pulp, hardboard or roofing felt.

[5]Livestock bedding, mulch, small dimension, and speciality items.

[6]Includes residue burned as waste.

Table 53.—*Timber products output from roundwood, by species and product, Prairie Unit, Minnesota, 1975*

Species	Saw logs		Veneer logs		Pulpwood		Fuelwood		Poles		Posts		Other products	All products
	[1]Thousand board feet	[2]Thousand cubic feet	[1]Thousand board feet	[2]Thousand cubic feet	Cords	[2]Thousand cubic feet	Cords	[2]Thousand cubic feet	Pieces	[2]Thousand cubic feet	Thousand pieces	[2]Thousand cubic feet	[2]Thousand cubic feet	[2]Thousand cubic feet
SOFTWOODS:														
White pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Red pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Jack pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Spruce	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Balsam fir	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tamarack	—	—	—	—	457	35	—	—	—	—	—	—	—	35
Northern white-cedar	—	—	—	—	—	—	572	39	—	—	—	—	—	39
Total	—	—	—	—	457	35	572	39	—	—	—	—	—	74
HARDWOODS:														
White oak	190	31	10	1	—	—	7,353	514	—	—	29	31	—	577
Red oak	177	29	29	3	—	—	2,168	145	—	—	17	17	—	194
Hickory	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Yellow birch	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hard maple	66	10	26	3	—	—	1,525	97	—	—	—	—	—	110
Soft maple	129	21	14	2	—	—	1,296	83	—	—	—	—	—	106
Ash	215	36	—	—	—	—	5,542	372	—	—	—	—	—	408
Balsam poplar	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Paper birch	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Aspen	16	2	—	—	—	—	572	37	—	—	—	—	—	39
Basswood	288	47	41	6	—	—	310	9	—	—	—	—	—	62
Elm	1,705	297	78	11	—	—	12,557	873	—	—	—	—	—	1,181
Black walnut	35	5	44	6	—	—	—	—	—	—	—	—	—	11
Cottonwood	2,409	422	104	16	—	—	2,611	165	—	—	—	—	—	603
Other hardwoods	—	—	—	—	—	—	2,606	163	—	—	—	—	—	163
Total	5,230	900	346	48	—	—	36,540	2,458	—	—	46	48	—	3,454
All species	5,230	900	346	48	457	35	37,112	2,497	—	—	46	48	—	3,528

[1]International ¼-inch rule.

[2]Small quantities may round off to less than 500 cubic feet and will be shown as a dash in columns showing thousand cubic feet.

Table 54.—*Sampling errors*[1] *for estimates smaller than Unit totals of volume, net growth, and removals and of area of commercial forest land in Minnesota's Prairie Unit, 1977*

Sampling error	Commercial forest area	Growing stock			Sawtimber		
		Inventory	Growth	Removals	Inventory	Growth	Removals
Percent	*Thousand acres*	*Million cubic feet*			*Million board feet*		
1	5,100.1	8,539.6	596.7	1,372.5	65,750.2	2,643.3	2,517.8
2	1,275.0	2,134.9	149.2	343.1	16,437.5	660.8	629.4
3	566.7	948.8	66.3	152.5	7,305.6	293.7	279.8
4	318.8	533.7	37.3	85.8	4,109.4	165.2	157.4
5	204.0	341.6	23.9	54.9	2,630.0	105.7	100.7
10	51.0	85.4	6.0	13.7	657.5	26.4	25.2
15	22.7	37.9	2.7	6.1	292.2	11.7	11.2
20	12.7	21.3	1.5	3.4	164.4	6.6	6.3
25	8.2	13.7	0.9	2.2	105.2	4.2	4.0
50	2.0	3.4	0.2	0.5	26.3	1.1	1.0
100	0.5	0.9	0.1	0.1	6.5	0.3	0.3

[1]At the 68% probability level.

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Hahn, Jerold T., and W. Brad Smith.
1980. Timber resource of Minnesota's Prairie Unit, 1977. U.S. Department of Agriculture Forest Service, Resource bulletin NC-45, 66 p. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

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KEY WORDS: timber volume, growth, utilization, forest area.

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